

Summary of the 2003 British Columbia Sablefish (*Anoplopoma fimbria*) Research and Assessment Survey

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SUMMARY OF THE 2003 BRITISH COLUMBIA SABLEFISH
(*Anoplopoma fimbria*) RESEARCH AND ASSESSMENT SURVEY

by

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ABSTRACT

Wyeth, M.R., Kronlund, A.R., and Elfert, M. 2004. Summary of the 2003 British Columbia Sablefish (*Anoplopoma fimbria*) research and assessment survey. Can. Data Rep. Fish. Aquat. Sci. 1148: viii + 68 p.

This document provides a summary of the methodology and results of the 2003 British Columbia Sablefish Research and Assessment Survey. The 2003 survey continued the time series of annual fall surveys initiated in 1988 and standardized beginning in 1990. Longline trap fishing was conducted at selected offshore and mainland inlet localities. Survey tasks were divided between two chartered commercial fishing vessels.

The standardized program vessel conducted standardized sets at nine offshore indexing localities and five mainland inlet localities. These sets provided a catch rate based abundance index used for stock assessment. In addition, sablefish were tagged and released from the sets fished in the mainland inlet localities.

The tagging program vessel conducted tagging sets at six offshore tagging localities and nine offshore indexing localities. These traditional tagging sets followed protocols used for tagging sets since 1995. The tagging program vessel also conducted 75 tagging sets following a stratified random design with five spatial and three depth strata.

Catch rates achieved for some of the sets during the 2003 survey exceeded historical highs; however, the mean annual catch rate over all sets was comparable to those observed in the early 1990s. The traditional tagging sets also yielded the highest catch rates of the time series. Catch rates for the mainland inlet standardized sets were some of the highest on record and were similar to the catch rates observed in 1999. Of the 66,824 sablefish captured, 24,584 were tagged and released, 357 previously tagged sablefish were recovered, and 18,132 were sampled for biological data.

RÉSUMÉ

Wyeth, M.R., Kronlund, A.R., and Elfert, M. 2004. Summary of the 2003 British Columbia Sablefish (*Anoplopoma fimbria*) research and assessment survey. Can. Data Rep. Fish. Aquat. Sci. 1148: viii + 68 p.

Sont présentés dans ce document un résumé des méthodes et des résultats du relevé de recherche et d'évaluation du stock de morue charbonnière de la Colombie-Britannique effectué en 2003. Ce relevé s'ajoute à la série chronologique de relevés annuels d'automne, dont le premier a été effectué en 1988 et qui sont normalisés depuis 1990. Il a été fait à l'aide de palangres et de casiers mouillés à des endroits choisis au large des côtes et dans des inlets continentaux. Les tâches ont été réparties entre deux bateaux de pêche commerciale affrétés.

Le bateau du programme normalisé a fait des mouillages normalisés à neuf endroits repères au large des côtes et à cinq endroits dans des inlets continentaux. Ces mouillages ont permis d'obtenir un indice d'abondance reposant sur les taux de capture, qui a servi à l'évaluation du stock. Des individus capturés dans les inlets continentaux ont aussi été étiquetés avant d'être remis à l'eau.

Le bateau du programme d'étiquetage a effectué des mouillages à six endroits d'étiquetage et à neuf endroits repères au large des côtes. Les mêmes protocoles utilisés pour les mouillages d'étiquetage depuis 1995 ont été suivis. Ce bateau a aussi effectué 75 mouillages d'étiquetage selon un plan aléatoire stratifié de cinq strates spatiales et de trois strates de profondeur.

Les taux de capture obtenus lors de certains des mouillages du relevé de 2003 dépassaient les pics historiques. Le taux de capture annuel moyen pour l'ensemble des mouillages se comparait toutefois à ceux observés au début des années 1990. Les mouillages d'étiquetage conventionnels ont aussi donné les taux de capture les plus élevés de la série chronologique. Les taux de capture pour les mouillages normalisés faits dans les inlets continentaux s'inscrivaient parmi les plus élevés enregistrés, se rapprochant des taux obtenus en 1999. Parmi les 66 824 morues charbonnières capturées, 24 584 ont été étiquetées puis remises à l'eau, 357 étaient des individus étiquetés par le passé et 18 132 ont fait l'objet de prélèvements de données biologiques.

1.0 INTRODUCTION

Sablefish (*Anoplopoma fimbria*) are an abundant and commercially valuable species throughout their range in the North Pacific. They have a long history of exploitation in Canadian waters with landings reported as early as the early 1800s (McFarlane and Beamish 1983). British Columbia fishermen harvest sablefish with longline trap, longline hook, and trawl gear along the continental shelf at depths up to 1800 m. The British Columbia sablefish fishery landed approximately 4000 metric tons annually for the period 1993 to 2003. The majority (>75%) of the fish were captured using trap gear.

In 1988 an annual sablefish research and assessment survey of the British Columbia coast was initiated. For details of how the annual sablefish survey has expanded and changed over the years, see Wyeth and Kronlund (2003). Each year, fishing was conducted at selected localities using trap gear consistent with the commercial fishery. The fishing protocol was refined over the first few years and was standardized beginning in 1990. These standardized sets (which have been referred to as "indexing" sets in previous survey reports) were designed to track trends in abundance and biological characteristics at the survey localities. In addition to the standardized component of the annual survey, sablefish were tagged and released beginning in 1991. In 1994, sets with the sole purpose of capturing sablefish for tag and release were added at the existing localities and in 1995, additional localities specifically for tagging sets were added. In 2002, a modest pilot program was used to investigate the feasibility of a randomized survey design where set positions were determined randomly (Wyeth et al. 2004).

The 2003 survey was a continuation of the annual sablefish research and assessment survey 1990 to 2002 standardized time series and followed the same protocols for fishing gear, catch monitoring, biological sampling, and tagging. For details on surveys conducted from 1988 through 1993, see Smith et al. (1996); for surveys in 1994 and 1995 see Downes et al. (1997); for surveys from 1996 to 2000 see Wyeth and Kronlund (2003), for the 2001 survey see Wyeth et al. (2003), and for the 2002 survey see Wyeth et al. (2004). Tag releases from 1977 through 1981 were described by Beamish et al. (1978, 1979, 1980, and 1983) and details of tag releases from 1982 through 1987 were documented by Murie et al. (1995). In 2003, standardized sets were conducted at offshore indexing localities and mainland inlet localities while tagging sets were conducted at offshore indexing localities and at offshore tagging localities. Following the success of fishing randomly positioned sets in 2002, a pilot stratified random design was introduced for the 2003 survey.

This document summarises the methods and results of the 2003 survey and consists of a main body of text with supporting appendices. Tables and figures referred to in the main text are sequentially numbered. Tables and figures in the appendices are labelled with the letter code of the appendix and a sequential number, e.g. Table A.2 for the second table in Appendix A.

2.0 METHODS

The 2003 sablefish survey followed protocols that have evolved over the 16 year life of the annual survey. Fishing was conducted at selected offshore and mainland inlet localities along the British Columbia coast. There were two types of sets. Standardized sets had rigorous gear specifications and were used to collect catch rate data intended to index trends in abundance and

to obtain fish for biological sampling. These sets were formerly referred to as "indexing" sets (see Wyeth and Kronlund 2003). Tagging sets had less rigorous gear requirements and were designed specifically to capture sablefish for tag and release. The protocol for standardized sets evolved over the first few years of the time series and beginning in 1990 they were conducted annually using a consistent protocol. The protocol for tagging sets has been consistent since 1996.

The 2003 survey included both a traditional component and a new pilot random design component. The traditional survey included standardized sets at offshore indexing localities and mainland inlet localities and tagging sets at offshore tagging localities and offshore indexing localities. The new randomized survey design combined abundance indexing and tagging objectives in one set type and followed a stratified random survey design with five spatial and three depth strata. Table 1 summarizes the components and set types conducted during the 2003 survey.

2.1 SURVEY VESSELS

The 2003 survey tasks were split between two vessels. The F/V Viking Star conducted the "standardized program" which consisted of standardized sets at offshore indexing localities and at mainland inlet localities (Table 1). The F/V Ocean Pearl conducted the "tagging program" which included traditional tagging sets in offshore indexing localities and offshore tagging localities as well as the random design survey (Table 1).

The F/V Viking Star, skippered by Jim Farrington, completed a total of 84 sets from October 7 to November 11, 2003 (Table 2). Detailed information for each set is listed in Appendix A. The F/V Ocean Pearl, skippered by Mike Derry, completed a total of 94 sets from October 15 to November 13, 2003 (Table 2). Detailed information for each set is listed in Appendix B.

2.2 TRADITIONAL SURVEY DESIGN

2.2.1 Localities

Skippers were directed to make sets within the geographic boundaries of the traditional survey localities (Figure 1, Table 3, Table 4).

2.2.1.1 Offshore Indexing Localities

Nine offshore indexing localities were visited in 2003 (Table 5, Figure 2, Figure 3). From north to south they were Langara Island-North Frederick, Hippa Island, Buck Point, Gowgaia Bay, Cape St. James, Triangle Island, Quatsino Sound, Esperanza Inlet, and Barkley Canyon.

2.2.1.2 Offshore Tagging Localities

Six offshore tagging localities were visited in 2003 (Table 5, Figure 2, Figure 3). From north to south they were Rennell Sound, Tasu Sound, Middle Ground, Pisces Canyon, Estevan Point, and Father Charles Canyon.

2.2.1.3 Mainland Inlet Localities

Five mainland inlet localities were visited in 2003. From north to south they were Portland Inlet, Gil Island, Finlayson Channel, and Dean/Burke Channel (Table 5, Figure 1). Prior to 2002, the skippers were directed to make five sets in each inlet locality and no specific locations were given. Nonetheless, there was a fair degree of consistency of the set locations within each inlet among years. In 2002, five locations were chosen within each inlet locality to spatially distribute the sets and to ensure consistency with the positions of sets conducted in previous years. The locations were described to the skipper in 2002 but no geographic limits were supplied (Wyeth et al. 2004). In 2003, the skipper was again directed to make one set in each location and the geographic boundaries of the locations were specified (Figure 4, Table 4).

2.2.2 Depth Strata

Within the offshore localities, the skipper had discretion over the exact location of all sets provided the sets were made in the specified depth strata.

One standardized set was made in each of the following seven depth strata at each offshore indexing locality (Table 7): 91-274 m (50-150 fm), 274-457 m (150-249 fm), 457-641 m (250-349 fm), 641-824 m (350-449 fm), 824-1006 m (450-549 fm), 1006-1189 m (550-649 fm), 1189-1389 m, and (650-749 fm). Beginning in 1990, five depth strata (D1-D5) at 183 m (100 fm) intervals were fished each year at each of the indexing localities. From 1999 to 2001 these core strata were supplemented with additional deep strata at selected indexing localities and at other locations (Wyeth et al. 2004). In 2002, two deep depth strata (D6-D7) were defined and corresponding deep sets were made at each indexing locality. For 2003, the deepest depth stratum (D7, 1372-1827 m, 750-999 fm) was only fished at the Barkley Canyon locality. However, a new shallow depth stratum (D0) was introduced in response to evidence of high sablefish abundance in shallow waters and anecdotal reports from the fishing industry.

Most sablefish tagged and released from offshore areas since 1995 were captured during traditional (Type 1) tagging sets. To maintain this tagging protocol, the 2003 survey included Type 1 tagging sets targeted at depths of 457-824 m (250-450 fm) where the highest catch rates were expected (Table 7). One or two Type 1 tagging sets were made at each of the 6 offshore tagging localities and a single Type 1 tagging set was made at each of the nine offshore indexing localities.

Sets at the mainland inlet localities were made at the prevailing depth of the set location (Table 7). Fishing within specific depth strata was not possible because of the steep-sided bathymetry of the inlets. One set was made in each of the locations defined in Table 4 (Figure 4) for a total of 5 sets in each locality.

2.3 STRATIFIED RANDOM SURVEY DESIGN

The stratified random survey was conducted in the offshore area of the British Columbia coast. The design consisted of five randomly chosen set positions within each of five spatial and three depth strata for a total of 75 sets. Canadian Hydrographic Service natural resource maps of coastal British Columbia were used to define the random survey depth strata. Three depth strata (Table 6) were selected to demarcate the shallow (91-457 m, 50-250 fm), deep (824-1372 m, 450-750 fm), and main (457-824 m, 250-450 fm) depth ranges of the commercial trap fishery.

The random design survey spatial strata boundaries were determined by examining large scale bathymetric features, spatial patterns of commercial trap fishing effort, and the relative areas of the spatial strata (Figure 5, Figure 6, Table 6). Based on the resolution of the bathymetry data and the estimated length of a string of 25 traps, a 2 km by 2 km grid was adopted as the sampling unit. Each 2 km by 2 km sampling unit that fell within both a spatial and a depth stratum was assigned a unique identification number.

Five sampling units were randomly selected from each of the 15 combinations of spatial and depth strata for a total of 75 set locations (Figure 5, Figure 6). One random design (Type 3) tagging set was made in each sampling unit. The skipper was directed to set as much of the string as possible within the selected 2 by 2 km unit providing the actual bottom depth in the unit was within the specified depth strata. If the specified depth range could not be found in the designated sampling unit or if the bottom relief precluded fishing, the skipper was directed to make the set in an adjacent sampling unit. Specifically, the set was to be made in the sampling unit to the east or west of the selected sampling unit. If those alternatives proved unworkable, sampling units to the north and south were to be attempted.

2.4 FISHING GEAR AND OPERATIONS

The fishing gear and operations used in 2003 were consistent with the protocol of surveys from 1990 onwards (Wyeth and Kronlund 2003). All sets were made using the charter vessels' longline trap gear which was typical of that employed in the commercial sablefish trap fishery. See Wyeth and Kronlund (2003) and Appendix J for a more detailed description of the survey fishing gear and setting and hauling procedures. Briefly, a set or "string" of longline trap gear consisted of a line resting on the ocean floor (groundline) with baited traps attached at intervals along its length (Figure 7). The groundline was secured to the ocean floor by anchors at each end and the location of the string was marked by floats attached to the groundline by anchorlines. A marked departure of the 2003 gear from the gear used in previous surveys is that the F/V Viking Star used only a single buoyline attached at one end of the string. The effect of this change was that the traps on the end of the string without the buoyline would be less susceptible to current and weather induced movement.

The F/V Viking Star used traps with black web and two stainless steel escape rings with internal diameters of either 102 or 95 mm (4 or 3 $\frac{3}{4}$ inch). The traps came from two manufacturers and one of the manufacturers used the larger escape ring size. The traps were new to the charter vessel and had not been fished so there was still web covering the escape ring openings.

The F/V Ocean Pearl used traps with the standard black web (Appendix J) as well as traps with larger green web. All Type 3 sets were made with green traps while the Type 1 sets had some traps with black web. The thread used in the green web was thicker than that in the black web and constructed from polypropylene as opposed to nylon. Further, the web used to cape the traps measured 100 mm (4 inches) between the knots when the web is stretched flat. This is a larger opening than the 70 mm (2 $\frac{3}{4}$ inches) stretched web that has been the standard web size for previous sablefish surveys. All traps had two stainless steel escape rings that were closed with 2 black nylon cable ties in an "X" across the opening. The vessel skipper reported that the escape rings had internal diameters of 86 mm (3 $\frac{7}{8}$ inch).

Standardized sets were fished with strings of 25 traps, each trap baited with an approximately 1 kg block of frozen squid in a bait bag. The species of squid used on the standardized program vessel was not determined but was most likely *Loligo opalescens*. All tagging sets were baited with a combination of a 1 kg block of frozen squid (*Illex argentinus*) in a bait bag and approximately 3 kg of frozen Pacific hake (*Merluccius productus*) loose in the trap. Type 1 tagging sets consisted of strings of approximately 70 traps while Type 3 tagging sets had 25 traps.

The start and end positions of each set were recorded from the vessel's global positioning system (GPS) when the first and last anchors were set over the stern. The start and end bottom depths were recorded from the vessel's depth sounder when the respective anchors were set. The mean bottom depth was calculated as the average of depth recordings from the vessel's depth sounder at one-minute intervals between the first and last anchors being set. The duration, or soak time, of the set was calculated as the time elapsed between the first anchor being set over the stern and the first anchor hauled aboard. Figure C.1 shows an example of a completed bridge log data form. In addition to the bridge log, science staff also observed each set from the deck and completed a set log (Figure C.2). Figure C.3 is a diagram of the Pacific Viking deck and shows how the space was used for survey tasks.

2.5 CATCH AND EFFORT DATA COLLECTION

The catch of all species in each trap was counted and weighed. All catch weights were taken using a Marel M1100 portable, motion-compensating electronic platform scale. Small animals weighing less than 1 kg were counted but not always weighed and large catches of small animals were weighed but not always counted. Effort data was calculated by tallying each trap as it was hauled aboard. Any damage to the trap was noted and necessary repairs were affected by the vessel crew before the trap was set again. Once the tagging goal was achieved during the Type 1 tagging sets, the catch from the rest of the string was counted but no weights were recorded. Figure C.4 shows an example of a completed catch log form.

2.6 CATCH PROCESSING

2.6.1 Recovered Tagged Sablefish

Previously tagged sablefish recovered during the survey were set aside as the catch was sorted. These fish were sacrificed and sampled after each set was completely hauled aboard. The fish were measured for fork length (L) in millimetres (mm) and, if weather conditions permitted accurate measurements, the whole body weight (W) was recorded in grams (g) or kilograms (kg). The abdominal cavities were opened and the gonads were examined to determine the fish sex (S) and to visually estimate the state of maturity (M, see Appendix D). Sagittal otoliths (O) were collected for subsequent age determination. The otoliths were excised from the fish, cleaned, and stored in 50% glycerine and 3% thymol solution in Tres Bien plastic trays. Figure C.5 shows an example of a completed recovered sablefish sampling form.

2.6.2 Biological Samples

Sablefish were sampled for fork length, sex, whole body weight, maturity, and otoliths. In addition, a tissue sample was taken from each of the first 10 fish sampled from most sets

conducted during the standardized program (F/V Viking Star). A paper hole-punch was used to collect the tissue sample from the fish's operculum. Tissue samples were stored in 95 % ethanol in Ependorf tubes.

In addition to the biological samples collected from sablefish, various other species were sampled during the 2003 survey. Sampling was conducted opportunistically when time permitted for a number of target species. Target species included yelloweye rockfish (*Sebastes ruberrimus*), redbanded rockfish (*Sebastes babcocki*), shortraker rockfish (*Sebastes borealis*), and Pacific sleeper sharks (*Somniosus pacificus*). Rockfish were sampled for fork length, sex, whole body weight, maturity (Appendix E), and otoliths. The sharks were sampled for total length in centimetres (cm), sex, whole body weight, and a section of the vertebral column of the fish was removed and frozen for subsequent age determination.

2.6.3 Tagging Procedures

Fish to be tagged were transferred from the sorting area using plastic baskets to a 2,400 litre fibreglass holding tank secured to the vessel's deck. The tank received a continuous supply of fresh seawater from the vessel's fire pump system. Fish were removed from the holding tank by hand or with a dip-net and then measured for fork length (mm) on a wooden measuring board. The tag was inserted on the left side of the fish at the base of the dorsal fin using a Mark II Long Tagging gun. The tag was injected approximately 1 cm below, and 2-3 cm behind the anterior insertion of the first dorsal fin. The tag was angled into the fish so the tag could stream and the vertebral column and internal organs would not be damaged. Any significant injuries to the fish were recorded prior to the fish being released. Figure C.5 shows an example of a completed tagging form.

2.6.3.1 Tag Type

All sablefish were tagged using a Floy FD-94 T-bar anchor tag. The information printed on the tag appeared as:

CSA REWARD PACIFIC BIO. STATION
NANAIMO, B.C. CANADA *## ### ###

where "*" is a letter and "#" is any single integer from 0 to 9, e.g. A00 123 456.

2.6.4 Standardized Sets At Offshore Indexing Localities

The goal for standardized sets conducted at offshore indexing localities was to obtain a LS(W)MO sample of at least 50 sablefish per set. Initially, the balance of the sablefish catch was used to obtain a LSM sample but high catch rates forced a reduction of the LSM sampling rate to a goal of approximately 150 fish per set. For each set, traps were allocated to each biological sample with the objective of distributing the selected traps along the entire length of the string. The specific selection method depended on the sablefish catch rate and varied from every trap, to every second or third trap, to a selection of traps spaced throughout the string. Prior to hauling each set, the first trap assigned to each sample was determined using a random number table. All the sablefish from selected traps were included in the same sample. Fish from traps that were not allocated to either biological sample were released alive although larger fish were retained by the vessel to be processed as commercial catch.

For example, suppose the average catch rate was 10 fish per trap and trap 3 was selected for the LS(W)MO sample and trap 2 was selected for the LSM sample. The catch of traps 3, 8, 13, 18, and 23 would be allocated to the LS(W)MO sample while the catch of traps 2, 4, 5, 7, 9, 10, 12, 14, 15, 17, 19, 20, 22, 24, and 25 would be allocated to the LSM sample. The catch of traps 1, 6, 11, 16, and 21 would be released. Figure C.7 shows an example of a completed LS(W)MO sampling form and Figure C.8 shows an example of a completed LSM sampling form. Appendix F shows how the sablefish catch of each trap was allocated for each set during the standardized program charter.

2.6.5 Standardized Sets At Mainland Inlet Localities

The goal for standardized sets conducted at mainland inlet localities was to obtain a LS(W)MO sample of at least 50 fish per set. Initially, the balance of the sablefish catch was tagged and released. However, high catch rates forced a reduction in the tagging rate as it became clear that the supply of tags would be insufficient to tag all the fish captured at all localities. An attempt was made to tag roughly 150 fish per set. For each set, traps along the entire length of the string were allocated to either the biological sample or to tagging following the methods described above.

2.6.6 Type 1 Tagging Sets

Biological samples were not collected from any fish captured during Type 1 tagging sets. The goal of the Type 1 tagging sets was to tag and release a total of 1000 sablefish in each of the 6 offshore tagging localities and 300 fish in each of the offshore indexing localities. Once the goal had been achieved in a locality, tagging was discontinued and the remainder of the sablefish were processed by the vessel to be landed as commercial catch.

2.6.7 Type 3 Tagging Sets

Traps were assigned to even and odd numbered groups for each Type 3 set. Prior to hauling each set, these two groups of traps were randomly assigned to either the biological sample or to tagging. So for each set, the catch from 12 (even group) or 13 (odd group) traps was tagged and released. Within the group of traps assigned to the biological sample, traps were allocated to the LS(W)MO sample with the objective of distributing the selected traps along the entire length of the string. The goal was to obtain a LS(W)MO sample of at least 50 fish per set. The specific selection method depended on the sablefish catch rate and varied from every trap, to every second or third trap, to a selection of traps spaced throughout the string. The catch from the balance of the traps assigned to the biological sample was sampled for LSM but if high catch rates were encountered, a 150 fish cap was adopted. After the cap was achieved, the sablefish from the subsequent traps assigned to the biological sample were released alive although larger fish were retained by the vessel to be processed as commercial catch. An attempt was made to select traps from throughout the string for the LSM sample but this was not always possible. Appendix G shows how the sablefish catch of each trap was used within each set during the random design survey.

2.7 OCEANOGRAPHIC SAMPLING

A Seabird SBE 39 temperature depth recorder was attached to a trap on selected sets conducted by the standardized program vessel. These data will be summarised elsewhere.

3.0 RESULTS

3.1 CATCH RATES

The annual distribution of catch rates (number of sablefish/number of traps) achieved for each set is summarised by boxplots for standardized sets at offshore indexing localities, standardized sets at mainland inlet localities, and tagging sets at offshore tagging localities and offshore indexing localities (Figure 8). The lower bound of the box indicates the first quartile (25th percentile) of the data and the upper bound of the box indicates the third quartile (75th percentile). The horizontal line that divides the box is the median (50th percentile). The upper and lower whiskers are positioned at 1.5 times the inter-quartile range. Open circles indicate data values that fall outside the whiskers, or outliers. The lightly shaded rectangle positioned in each box represents an approximate 95 percent confidence interval for the sample median. Solid circles indicate the mean catch rate for each group. The nominal data are presented here with no attempt to filter data or standardize for any factors. All traps that could have captured fish were included in the calculation of catch rates. For example, holed or fouled traps were included while open traps were excluded. Some entire sets from previous surveys were excluded from the catch rate plots. For example, set types other than standardized and tagging sets or sets where the total catch was not recorded. The fishing protocol has varied over the time period shown (Wyeth and Kronlund 2003, Wyeth et al. 2004). Specifically, the more recent surveys have spanned a greater depth range than the early surveys. The 1988 and 1989 catch rates are not shown as they were significantly different than subsequent surveys, with much longer strings and different baiting practices (Wyeth and Kronlund 2003).

High catch rates were achieved during standardized sets at offshore indexing localities until 1993, but from 1994 to 2000, catch rates were consistently at a lower level (Figure 8). The 2001 survey yielded the lowest mean standardized catch rate and also exhibited significantly reduced variability. Catch rates in 2002 were at levels similar to those achieved in the late 1990s and the highest individual set catch rates of the time series were observed during 2003. The 2003 mean annual catch rate was near highs observed in the early 1990s.

In years when both standardized and Type 1 tagging sets were conducted at offshore localities, the catch rates for tagging sets were greater (Figure 8). This may be due to the target depths of the traditional tagging sets but it may also be due to the addition of Pacific hake to the bait load. The highest catch rates from traditional tagging sets were observed in 2003 and the mean annual catch rate was also the highest on record.

Catch rates of standardized sets conducted at mainland inlet localities have remained relatively consistent among years with the exception of high catch rates in 1998, 1999, and 2003 (Figure 8).

The distribution of catch rates for the stratified random design sets was similar to the catch rates of the traditional survey (Figure 9). The highest catch rates were seen in the mid depth stratum while the deep stratum exhibited the lowest distribution of catch rates. Catch rates were most variable in the shallow depth stratum. The spatial strata off the Queen Charlotte Islands (S_4 and S_5) exhibited the most variable catch rates while the highest distribution of catch rates was seen off the northern west coast of Vancouver Island (S_2).

3.2 CATCH COMPOSITION

Forty species or taxonomic groups were captured during standardized sets conducted at offshore indexing localities (Table 8). Other than sablefish, the most common species in order of total weight captured were lingcod (*Ophiodon elongatus*), rougheye rockfish (*Sebastes aleutianus*), arrowtooth flounder (*Atheresthes stomias*), giant grenadiers (*Albatrossia pectoralis*), Pacific halibut (*Hippoglossus stenolepis*), and Pacific grenadiers (*Coryphaenoides acrolepis*). Other species accounted for minor fractions of the total catch.

Eleven species or taxonomic groups were captured during standardized sets conducted at mainland inlet localities (Table 9). Other than sablefish, the most common species in order of total weight captured were Pacific halibut (*Hippoglossus stenolepis*) and Pacific sleeper shark (*Somniosus pacificus*). Other species accounted for minor fractions of the total catch.

Twenty-one species or taxonomic groups were captured during Type 1 tagging sets (Table 10). Other than sablefish, the most common species in order of total numbers were rougheye rockfish (*Sebastes aleutianus*), tanner crabs (*Chionoecetes* sp.), and spiny dogfish (*Squalus acanthias*). Other species accounted for minor fractions of the total catch.

Thirty-two species or taxonomic groups were captured during Type 3 tagging sets (Table 11). Other than sablefish, the most common species in order of total weight were dogfish (*Squalus acanthias*), lingcod (*Ophiodon elongatus*), arrowtooth flounder (*Atheresthes stomias*), Pacific halibut (*Hippoglossus stenolepis*), tanner crabs (*Chionoecetes* sp.), rougheye rockfish (*Sebastes aleutianus*), Pacific grenadiers (*Coryphaenoides acrolepis*), redbanded rockfish (*Sebastes babcocki*), and giant grenadiers (*Albatrossia pectoralis*). Other species accounted for minor fractions of the total catch.

The differences in the relative abundance of species between the various types of sets conducted in 2003 may be explained by the range of depths fished. For example, the standardized sets in offshore localities had more grenadiers and lingcod than the Type 1 tagging sets. The standardized sets were fished over a broader depth range and at relatively deeper depths than the Type 1 tagging sets. Differences could also be attributed to the Pacific hake and squid bait used by the tagging program charter compared to the standardized survey charter which used squid only.

3.3 SABLEFISH SAMPLING AND TAGGING

Of the 44,769 sablefish captured during the 2003 traditional survey, 22,154 were either tagged or used for biological sampling (Table 12). A total of 13,215 sablefish were tagged and released with 2,809 from offshore indexing localities, 5,999 from offshore tagging localities, and 4,407 from the inlet localities. In addition, 8,632 sablefish were sampled for length and sex, of

which 7,622 were also examined for maturity state, otoliths were collected from 3,750 and 2,596 were weighed. A total of 288 previously tagged sablefish were recovered during the 2003 traditional survey.

Of the 22,055 sablefish captured during the 2003 random design survey, 20,939 were either tagged or used for biological sampling (Table 13). A total of 11,369 sablefish were tagged and released and 69 previously tagged sablefish were recovered. In addition, 9,500 sablefish were sampled for length, sex, and maturity state, of which 2,227 were also weighed and otoliths were collected from 3,166.

The sex ratio varied among the traditional localities from 30 to 59 percent males (Table 14). Proportionally fewer males were seen at all localities except Triangle Island. In contrast, the sex ratio in the random spatial strata was fairly consistent and proportionately more males were seen in all strata except for S₄ (Table 15). The apparent difference between the random design and the traditional survey may be explained by the broader range of depths fished during the standardized component of the traditional survey. The mean fork length of females was greater than that of males at all the traditional survey localities (Table 14) and at all the random design spatial strata (Table 15).

A total of 171 fish of species other than sablefish were sampled during the 2003 survey (Table 16).

Details on the number of sablefish captured, sampled, and tagged for each set are shown in Appendix H for the standardized survey charter and Appendix I for the tagging program charter.

4.0 ACKNOWLEDGEMENTS

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5.0 REFERENCES

- Beamish, R.J., Wood, C., and Houle, C. 1978. A summary of sablefish tagging studies conducted during 1977 by the Pacific Biological Station. Fish. Mar. Serv. Data Rep. 77: 102p.
- Beamish, R.J., Houle, C., Wood, C., and Scarsbrook, R.. 1979. A summary of sablefish tagging and exploratory trapping studies conducted during 1978 by the Pacific Biological Station. Can. Data Rep. Fish. Aquat. Sci. 162: 113 p.
- Beamish, R.J., Houle, C., and Scarsbrook. 1980. A summary of sablefish tagging and biological studies conducted during 1979 by the Pacific Biological Station. Can. Manusc. Rep. Fish. Aquat. Sci. 1588: 194 p.
- Beamish, R.J., McFarlane, G.A., Scarsbrook, R., Chilton, D., Barber, I., Best, K., Cass, A, and Shaw, W. 1983. A summary of sablefish tagging and biological studies conducted during 1980 and 1981 by the Pacific Biological Station. Can. Manusc. Rep. Fish. Aquat. Sci. 1732: 135p.
- Downes, A.J., Andrews, W.T., Smith, M.S., Saunders, M.W., and Jewsbury, G.D. 1997. Cruise details of sablefish (*Anoplopoma fimbria*) surveys conducted in B.C. waters, 1994-1995. Can. Data. Rep. Fish. Aquat. Sci. 1007: 106 p.
- McFarlane, G.A., and Beamish, R. J. 1983. Overview of the fishery and management strategy for sablefish (*Anoplopoma fimbria*) off the west coast of Canada. p.13-35. In Proceedings of the Second Lowell Wakefield Fisheries Symposium, Anchorage, AK, Alaska Sea Grant Report 83-3.
- Murie, D.J., Mitton, W., Saunders, M.W., and McFarlane, G.A. 1995. A summary of sablefish tagging and biological studies conducted during 1982-87 by the Pacific Biological Station. Can. Data Rep. Fish. Aquat. Sci. 959: 84 p.
- Smith, M.S., Saunders, M.W., and Andrews, W.T. 1996. Cruise details of sablefish (*Anoplopoma fimbria*) surveys conducted in B.C. waters 1988-1993. Can. Data Rep. Fish. Aquat. Sci. 976: 129 p.
- Wyeth, M.R. and Kronlund, A.R.. 2003. Sablefish (*Anoplopoma fimbria*) Research and Assessment Surveys conducted in British Columbia waters from 1996 through 2000. Can. Data Rep. Fish. Aquat. Sci. 1116: 130 p.
- Wyeth, M.R., Kronlund, A.R., and Elfert, M. 2003. Summary of the 2001 British Columbia Sablefish (*Anoplopoma fimbria*) Research and Assessment Survey. Can. Data Rep. Fish. Aquat. Sci. 1118: 54 p.
- Wyeth, M.R., Kronlund, A.R., and Elfert, M.. 2004. Summary of the 2002 British Columbia Sablefish (*Anoplopoma fimbria*) Research and Assessment Survey. Can. Data Rep. Fish. Aquat. Sci. 1140: 59 p.

Table 1. Summary of sets conducted during the 2003 Sablefish Research and Assessment Survey.

Survey	Charter	Set Type	Location	Depth	Traps	Bait	Sablefish Catch Processing
Traditional	Standardized Program (Viking Star)	Standardized	nine offshore indexing localities	7 depth strata	25	1 kg squid	50 piece LS(W)MO biosample, 150 piece LSM biosample
		Standardized	specified locations in five mainland inlet localities	prevailing depth	25	1 kg squid	50 piece LS(W)MO biosample, tag remainder or tag 150 pieces
	Tagging Program (Ocean Pearl)	Type 1 (traditional) tagging	six offshore tagging localities and	250-450 fm	-60	1 kg squid plus 4.5 kg hake	all tagged until 1000 fish released in each locality
		Type 1 (traditional) tagging	nine offshore indexing localities	250-450 fm	-60	1 kg squid plus 4.5 kg hake	all tagged until 300 fish released in each locality
Random Design		Type 3 (random) tagging	random selection of 2 km by 2 km boxes in five spatial strata	3 depth strata	25	1 kg squid plus 4.5 kg hake	50 % of traps tagged, 50% of traps biosampled (50 piece LS(W)MO, 150 piece LSM)

Table 2. British Columbia Sablefish Research and Assessment Surveys conducted from 1988 to 2003.

Year	Vessel	Skipper	Dates	Sets	GFBio Trip ID
1988	F/V Vicious Fisher	Vance Fletcher	28 Oct - 24 Nov	16	43990
1989	F/V La Porsche	Sigurd Brynjolfson	19 Oct - 18 Nov	29	43910
1990	F/V Viking Star	Doug Farrington	08 Nov - 18 Nov	24	43750
1991	R/V W. E. Ricker	Alan Farrington	09 Oct - 29 Oct	32	43673
1992	R/V W. E. Ricker	Ron Roberts	13 Oct - 04 Nov	38	43670
1993	R/V W. E. Ricker	Alan Farrington	19 Oct - 11 Nov	42	43650
1994	F/V La Porsche	Richard Beauvais	13 Oct - 31 Oct	39	43630
	F/V Western Viking	Rick Jones	18 Oct - 13 Nov	27	43390
1995	F/V Ocean Pearl	Robert Fraumeni	08 Oct - 20 Oct	29	43270
	F/V Victor F	Michael Derry	11 Oct - 28 Oct	34	43330
	F/V Viking Sunrise	Jason Olsen	01 Oct - 31 Oct	40	43350
1996	F/V Viking Sunrise	Albert Melnychuck	10 May - 30 May	42	43024
	F/V Ocean Pearl	Michael Derry	26 Sept - 10 Oct	32	43039
	F/V Viking Star	Otto Elvan	30 Sept - 22 Oct	49	43210
1997	F/V Viking Sunrise	Albert Melnychuck	20 May - 10 Jun	42	42760
	F/V Ocean Pearl	Michael Derry	26 Sept - 21 Oct	74	42699
1998	F/V Ocean Pearl	Michael Derry	22 Sept - 17 Oct	89	41122
1999	F/V Ocean Pearl	Michael Derry	29 Sept - 30 Oct	109	40589
2000	F/V Pacific Viking	Albert Melnychuck	08 Oct - 14 Nov	131	40517
2001	F/V Ocean Pearl	Michael Derry	06 Oct - 06 Nov	134	43233
2002	F/V Pacific Viking	Albert Melnychuck	04 Oct - 05 Nov	125	48120
	F/V Viking Sunrise	Jason Olsen	05 Oct - 12 Nov	90	48110
2003	F/V Viking Star	Jim Farrington	07 Oct - 09 Nov	84	52120
	F/V Ocean Pearl	Michael Derry	15 Oct - 13 Nov	94	52100

Table 3. Geographic boundaries of the traditional sablefish survey offshore localities.

Locality	Latitude North		Longitude West	
	Maximum	Minimum	Maximum	Minimum
Offshore Indexing				
Langara Island-North Frederick	54°9'	53°59'	134°2'	133°32'
Hippa Island	53°32'	53°20'	133°24'	132°55'
Buck Point	53°14'	53°01'	133°10'	132°35'
Gowgaia Bay	52°27'	52°17'	131°51'	131°33'
Cape St. James ¹	51°50'	51°37'	130°59'	130°19'
Triangle Island	51°08'	50°58'	129°55'	129°31'
Quatsino Sound	50°25'	50°12'	128°38'	128°08'
Esperanza Inlet	49°47'	49°24'	127°39'	127°13'
Barkley Canyon	48°24'	48°10'	126°12'	125°53'
Offshore Tagging				
Rennell Sound	53°33'	53°14'	133°17'	132°55'
Tasu Sound	52°49'	52°34'	132°16'	131°58'
Middle Ground	51°20'	51°09'	130°9'	129°57'
Pisces Canyon	50°37'	50°29'	128°47'	128°34'
Estevan Point	49°16'	48°59'	127°10'	126°53'
Father Charles Canyon	48°29'	48°46'	126°35'	126°09'

¹ The South Moresby Rockfish Protected Area (RPA) overlaps slightly with the Cape St. James survey locality so sets were not made in the Northwest corner of the locality. The South Moresby RPA is described as:, McLean-Fraser Point to Grey Rock: Subareas 2-31 to 2-37 and those portions of Subareas 102-3, 130-3 and 142-1 that are inside of a line that begins at 52 deg 12 min north and 131 deg 25 min west, then southwesterly to 52 deg 11 min north and 131 deg 30 min west, then southeasterly to 51 deg 49 min north and 130 deg 57 min west, then northerly to 51 deg 54 min north and 130 deg 54 min west, then northeasterly to 51 deg 59 min north and 131 deg west.

Table 4. Geographic boundaries of the locations within each mainland inlet locality. Each location was defined as the area enclosed by the polygon with vertices at each of the four or five defined points.

Locality	Location	Point 1		Point 2		Point 3		Point 4		Point 5	
		Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude
Portland Inlet	1	54 51.90	130 14.70	54 54.75	130 11.43	54 53.53	130 07.50	54 50.51	130 10.45		
	2	54 46.57	130 15.18	54 48.70	130 19.46	54 49.97	130 16.82	54 48.14	130 12.85		
	3	54 44.25	130 21.31	54 46.29	130 24.31	54 47.83	130 21.43	54 45.24	130 17.90		
	4	54 43.52	130 22.73	54 40.21	130 23.55	54 42.28	130 28.61	54 45.42	130 26.19		
	5	54 39.31	130 26.42	54 37.27	130 30.74	54 39.29	130 35.00	54 41.80	130 30.17		
Gil Island	1	53 18.05	129 16.39	53 18.44	129 19.88	53 21.43	129 19.95	53 19.66	129 16.42		
	2	53 09.54	129 20.71	53 09.91	129 25.97	53 12.99	129 24.20	53 12.98	129 19.84		
	3	53 06.18	129 18.06	53 04.06	129 21.26	53 07.44	129 24.93	53 08.68	129 20.47		
	4	53 07.25	129 05.11	53 05.89	129 05.03	53 05.84	129 09.03	53 07.42	129 08.51		
	5	53 11.48	129 05.23	53 09.64	129 05.11	53 09.87	129 09.73	53 12.37	129 08.86		
Finlayson Channel	1	52 45.95	128 26.18	52 46.80	128 27.62	52 48.50	128 27.06	52 47.76	128 24.27		
	2	52 44.04	128 26.51	52 41.68	128 25.75	52 42.06	128 28.50	52 44.40	128 28.94		
	3	52 40.09	128 26.28	52 38.70	128 26.49	52 38.58	128 30.19	52 40.92	128 29.26		
	4	52 34.94	128 26.40	52 33.73	128 25.99	52 33.77	128 29.28	52 35.14	128 29.82		
	5	52 30.05	128 25.23	52 29.61	128 28.35	52 31.58	128 29.35	52 31.45	128 26.22		
Dean/ Burke Channel	1	52 21.75	127 26.49	52 19.95	127 27.44	52 20.03	127 30.27	52 21.89	127 28.77		
	2	52 27.03	127 14.35	52 25.39	127 14.18	52 26.38	127 16.35	52 27.22	127 17.64	52 27.83	127 16.18
	3	52 16.38	127 13.24	52 15.01	127 16.01	52 16.27	127 17.70	52 17.50	127 15.34		
	4	52 13.00	127 27.24	52 14.71	127 24.89	52 13.36	127 22.83	52 11.53	127 25.11		
	5	52 07.46	127 34.67	52 06.33	127 36.72	52 07.44	127 38.90	52 08.74	127 35.60		

Table 5. Localities visited during sablefish research and assessment surveys from 1994 through 2003 showing the number of standardized(S) and tagging(T) sets completed at each locality. For simplicity, surveys conducted prior to 1994 and the spring tagging surveys conducted in 1996 and 1997 are not shown (for details on these surveys, see Wyeth and Kronlund 2003). Localities that are no longer visited are shown in italics.

Year	1994		1995		1996		1997		1998		1999		2000		2001		2002		2003	
Set Type	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T
Locality	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T
Offshore Indexing	Langara Island-North																			
	Frederick																			
	Louis Point-Frederick																			
	Island																			
	Kunakun Point																			
	Hippa Island																			
	Buck Point																			
	Tasu Sound-Marble Island																			
	Gowgaia Bay																			
	Flamingo Inlet																			
	Cape St. James																			
	Triangle Island																			
	Quatsino Sound																			
	Solander Island																			
	Esperanza Inlet																			
Barkley Canyon																				
Total																				
Mainland Inlet	Portland Inlet																			
	Gil Island																			
	Finlayson Channel																			
	Mathieson Channel																			
	Dean/Burke Channel																			
	Total																			

Offshore Indexing

Mainland

Year	1994		1995		1996		1997		1998		1999		2000		2001		2002		2003	
	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T
Set Type																				
Locality																				
Frederick Island	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hogback	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Rennell Sound	-	-	-	-	2	-	2	-	-	-	8	-	5	-	4	-	2	-	2	-
Chads Point	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tasu Sound	-	-	-	-	-	2	-	2	-	5	-	5	-	3	-	4	-	3	-	1
Anthony Island	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mitchell's Gully/Middle	-	-	-	3	-	3	-	2	-	4	-	3	-	4	-	4	-	3	-	1
Ground																				
Pisces Canyon	-	-	-	2	-	3	-	2	-	4	-	6	-	4	-	4	-	3	-	2
Kyuquot Sound-Ouokinish	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-
Inlet																				
Estevan Point	-	-	-	2	-	3	-	2	-	4	-	4	-	4	-	4	-	3	-	1
Father Charles Canyon	-	-	-	2	-	3	-	2	-	3	-	4	-	4	-	4	-	3	-	2
Total	-	-	-	27	-	16	-	14	-	24	-	30	-	24	-	24	-	17	-	9
Grand Total	60	2	68	22	65	16	60	14	65	24	69	37	92	33	92	33	125	90	84	19

Offshore Tagging

Table 6. Summary of stratified random survey design. The area (km²) of each spatial (S_i) and depth (RD_j) stratum combination is indicated, with the number of possible 2 km by 2km sampling units per stratum in parentheses ().

Stratum	RD ₁	RD ₂	RD ₃	All Depths
	183-457 m (100-250 fm)	457-824 m (250-450 fm)	824-1372 m (450-750 fm)	
S ₁	1,088 (272)	1,236 (309)	2,024 (506)	4,348 (1,087)
S ₂	976 (244)	1,252 (313)	2,236 (559)	4,464 (1,116)
S ₃	3,628 (907)	1,240 (310)	1,372 (343)	6,240 (1,560)
S ₄	456 (114)	496 (124)	1,384 (346)	2,336 (584)
S ₅	1,508 (377)	1,020 (255)	1,672 (418)	4,200 (1,050)
All Areas	7,656 (1,914)	5,244 (1,311)	8,688 (2,172)	21,588 (5,397)

Table 7. Sablefish research and assessment survey depth strata.

Depth Strata	Minimum depth m (fm)	Maximum depth m (fm)
Offshore Standardized		
D0	91 (50)	274 (149)
D1	274 (150)	457 (249)
D2	457 (250)	641 (349)
D3	641 (350)	824 (449)
D4	824 (450)	1006 (549)
D5	1006 (550)	1189 (649)
D6	1189 (650)	1372 (749)
D7	1372 (750)	1827 (999)
Type 1 Tagging		
	457 (250)	824 (450)
Type 3 Tagging		
RD ₁	91 (50)	457 (250)
RD ₂	457 (250)	824 (450)
RD ₃	824 (450)	1372 (750)
Mainland Inlet Standardized		
prevailing depth at set locations		

Table 8. Summary of species captured during the 2003 survey standardized sets conducted at offshore indexing localities.

Common name	Scientific Name	Total Count	Total Weight
Round fish			
Sablefish	<i>Anoplopoma fimbria</i>	12,992	35,928
Pacific grenadier	<i>Coryphaenoides acrolepis</i>	377	300
Lingcod	<i>Ophiodon elongatus</i>	137	1,162
Giant grenadier	<i>Albatrossia pectoralis</i>	95	369
Snailfishes	Cyclopteridae	19	8
Pacific flatnose	<i>Antimora microlepis</i>	19	12
Spiny dogfish	<i>Squalus acanthias</i>	8	25
Pacific cod	<i>Gadus macrocephalus</i>	2	5
Spotted ratfish	<i>Hydrolagus colliei</i>	1	1
Skilfish	<i>Erilepis zonifer</i>	1	12
Pacific sleeper shark	<i>Somniosus pacificus</i>	1	17
Rockfish			
Rougheye rockfish	<i>Sebastes aleutianus</i>	268	426
Redbanded rockfish	<i>Sebastes babcocki</i>	37	58
Shortspine thornyhead	<i>Sebastolobus alascanus</i>	15	15
Longspine thornyhead	<i>Sebastolobus altivelis</i>	12	2
Pacific ocean perch	<i>Sebastes alutus</i>	8	7
Rosethorn rockfish	<i>Sebastes helvomiculatus</i>	7	2
Shortraker rockfish	<i>Sebastes borealis</i>	6	23
Darkblotched rockfish	<i>Sebastes crameri</i>	2	1
Splitnose rockfish	<i>Sebastes diploproa</i>	1	trace
Yelloweye rockfish	<i>Sebastes ruberrimus</i>	1	4
Redstripe rockfish	<i>Sebastes proriger</i>	1	trace
Flatfish			
Arrowtooth flounder	<i>Atheresthes stomias</i>	187	376
Pacific halibut	<i>Hippoglossus stenolepis</i>	36	328
Dover sole	<i>Microstomus pacificus</i>	18	26
Invertebrates			
<i>Lithodes couesi</i>	<i>Lithodes couesi</i>	278	60
Gastropods	Gastropoda	116	
<i>Chionoecetes tanneri</i>	<i>Chionoecetes tanneri</i>	112	19
Sea urchins	Echinacea	25	trace
<i>Paralomis multispina</i>	<i>Paralomis multispina</i>	25	10
Brown king crab	<i>Paralithodes brevipes</i>	21	3
Box crabs	Lopholithodes	13	4
Sea cucumber	Holothuroidea	11	
Starfish	Asteriodes	6	1
Red king crab	<i>Paralithodes camtschatica</i>	5	2

Common name	Scientific Name	Total Count	Total Weight
Alaskan king crabs	Paralithodes	4	trace
Heart urchins	Atelostomata	3	
Octopus	Octopoda	2	3
Prawn	<i>Pandalus platyceros</i>	2	
Brittle stars	Phrynophiurida		3

Table 9. Summary of species captured during the 2003 survey standardized sets conducted at mainland inlet localities.

Common name	Scientific Name	Total Count	Total Weight
Round fish			
Sablefish	<i>Anoplopoma fimbria</i>	9,964	21,968
Walleye pollock	<i>Theragra chalcogramma</i>	2	3
Pacific sleeper shark	<i>Somniosus pacificus</i>	1	77
Flatfish			
Pacific halibut	<i>Hippoglossus stenolepis</i>	39	275
Arrowtooth flounder	<i>Atheresthes stomias</i>	10	15
Dover sole	<i>Microstomus pacificus</i>	1	1
Invertebrates			
Heart urchins	Atelostomata	25	1
Gastropods	Gastropoda	8	
<i>Chionoecetes tanneri</i>	<i>Chionoecetes tanneri</i>	3	1
<i>Chionoecetes bairdi</i>	<i>Chionoecetes bairdi</i>	2	trace
Starfish	Asteriodea	1	

Table 10. Summary of species captured during the 2003 survey Type 1 tagging sets conducted at offshore indexing and offshore tagging localities. Catch weights were not always recorded so the total weight is not shown.

Common name	Scientific Name	Total Count
Round fish		
Sablefish	<i>Anoplopoma fimbria</i>	21,813
Spiny dogfish	<i>Squalus acanthias</i>	21
Pacific grenadier	<i>Coryphaenoides acrolepis</i>	9
Lingcod	<i>Ophiodon elongatus</i>	4
Giant grenadier	<i>Albatrossia pectoralis</i>	2
Skilfish	<i>Erilepis zonifer</i>	1
Rockfish		
Rougheye rockfish	<i>Sebastes aleutianus</i>	118
Shortraker rockfish	<i>Sebastes borealis</i>	6
Shortspine thornyhead	<i>Sebastolobus alascanus</i>	4
Aurora rockfish	<i>Sebastes aurora</i>	2
Redbanded rockfish	<i>Sebastes babcocki</i>	2
Yelloweye rockfish	<i>Sebastes ruberrimus</i>	1
Rosethorn rockfish	<i>Sebastes helvomaculatus</i>	1
Flatfish		
Arrowtooth flounder	<i>Atheresthes stomias</i>	39
Pacific halibut	<i>Hippoglossus stenolepis</i>	11
Dover sole	<i>Microstomus pacificus</i>	2
Invertebrates		
Tanner crabs	<i>Chionoecetes</i> spp	99
<i>Lithodes couesi</i>	<i>Lithodes couesi</i>	12
Sea urchins	Echinacea	2
Starfish	Asteriodea	2
Gastropods	Gastropoda	1

Table 11. Summary of species captured during the random design component of the 2003 survey.

Common name	Scientific Name	Total Count	Total Weight
Round fish			
Sablefish	<i>Anoplopoma fimbria</i>	22,055	56,617
Spiny dogfish	<i>Squalus acanthias</i>	800	1,989
Pacific grenadier	<i>Coryphaenoides acrolepis</i>	338	347
Lingcod	<i>Ophiodon elongatus</i>	89	820
Giant grenadier	<i>Albatrossia pectoralis</i>	29	177
Pacific cod	<i>Gadus macrocephalus</i>	8	23
Hagfishes	Myxinidae	1	
Snailfishes	Liparinae	1	trace
Pacific flatnose	<i>Antimora microlepis</i>	1	trace
Rockfish			
Rougheyeye rockfish	<i>Sebastes aleutianus</i>	187	358
Redbanded rockfish	<i>Sebastes babcocki</i>	111	200
Shortspine thornyhead	<i>Sebastolobus alascanus</i>	19	37
Yelloweye rockfish	<i>Sebastes ruberrimus</i>	18	63
Yellowmouth rockfish	<i>Sebastes reedi</i>	12	16
Shortraker rockfish	<i>Sebastes borealis</i>	8	31
Longspine thornyhead	<i>Sebastolobus altivelis</i>	3	
Rosethorn rockfish	<i>Sebastes helvomaculatus</i>	1	1
Flatfish			
Arrowtooth flounder	<i>Atheresthes stomias</i>	352	816
Pacific halibut	<i>Hippoglossus stenolepis</i>	76	758
Dover sole	<i>Microstomus pacificus</i>	5	6
Southern rock sole	<i>Lepidopsetta bilineata</i>	1	1
Invertebrates			
Tanner crabs	<i>Chionoecetes</i> spp	1,053	411
<i>Lithodes couesi</i>	<i>Lithodes couesi</i>	75	22
Sea urchins	Echinacea	27	1
Starfish	Asteriodea	12	2
<i>Paralomis multispina</i>	<i>Paralomis multispina</i>	10	7
Box crabs	Lopholithodes	9	3
Gastropods	Gastropoda	5	
Octopus	Octopoda	2	8
Sea pens	Pennatulacea	2	
Golden king crab	<i>Lithodes aequispina</i>	1	2
Sea lilies and feather stars	Crinodea	1	
<i>Chionoecetes tanneri</i>	<i>Chionoecetes tanneri</i>	1	trace

Table 12. Summary of the number of sablefish recovered, tagged, and sampled during the traditional component of the 2003 survey.

Locality	Number of sablefish		Number of sablefish sampled for					Total
	Recovered	Tagged	Length	Sex	Maturity	Otoliths	Weight	
Offshore Indexing								
Langara Island-North								
Frederick	2	305	648	648	648	252	233	955
Hippa Island	23	309	732	733	733	334	337	1,065
Buck Point	5	334	600	601	601	201	98	940
Gowgaia Bay	5	305	555	555	555	225	40	865
Cape St. James	12	306	630	630	630	230	92	948
Triangle Island	12	301	913	927	927	319	176	1,240
Quatsino Sound	4	302	666	666	665	303	239	972
Esperanza Inlet	9	321	1,356	1,356	1,356	385	254	1,686
Barkley Canyon	5	326	1,398	1,395	371	371	368	1,730
Total	77	2,809	7,498	7,511	6,486	2,620	1,837	10,401
Offshore Tagging								
Rennell Sound	27	1,001	0	0	0	0	0	1,028
Tasu Sound	13	1,068	0	0	0	0	0	1,081
Middle Ground	60	935	0	0	0	0	0	995
Pisces Canyon	4	1,016	0	0	0	0	0	1,020
Estevan Point	7	1,006	0	0	0	0	0	1,013
Father Charles Canyon	11	973	0	0	0	0	0	984
Total	122	5,999	0	0	0	0	0	6,121
Mainland Inlet								
Portland Inlet	7	421	355	355	355	353	355	783
Gil Island	24	1,016	275	275	275	275	275	1,315
Finlayson Channel	39	1,643	254	254	254	250	59	1,936
Dean/Burke Channel	19	1,327	250	252	252	252	70	1,598
Total	89	4,407	1,134	1,136	1,136	1,130	759	5,632
Traditional Survey Total								
	288	13,215	8,632	8,647	7,622	3,750	2,596	22,154

Table 13. Summary of sablefish recovered, tagged, and sampled during the stratified random design component of the 2003 survey.

Stratum		Number of sablefish			Number of sablefish sampled for					
Spatial	Depth	Recovered	Tagged	Length	Sex	Maturity	Otoliths	Weight	Total	
S ₁	RD ₁	0	981	911	911	907	245	44	1,892	
	RD ₂	19	535	560	560	559	265	136	1,095	
	RD ₃	1	120	126	126	125	112	111	246	
	All	20	1,636	1,597	1,597	1,591	622	291	3,233	
S ₂	RD ₁	2	715	767	767	767	246	196	1,482	
	RD ₂	5	1,473	1,341	1,340	1,340	263	211	2,814	
	RD ₃	7	831	755	755	754	266	261	1,586	
	All	15	3,019	2,863	2,862	2,861	775	668	5,882	
S ₃	RD ₁	1	926	651	651	651	214	121	1,577	
	RD ₂	1	1,157	964	964	963	263	211	2,121	
	RD ₃	6	552	513	513	513	261	211	1,065	
	All	8	2,635	2,128	2,128	2,127	738	543	4,763	
S ₄	RD ₁	3	315	333	333	333	183	183	648	
	RD ₂	7	1,372	988	988	984	269	268	2,360	
	RD ₃	2	197	196	196	196	126	126	393	
	All	12	1,884	1,517	1,517	1,513	578	577	3,401	
S ₅	RD ₁	2	804	369	369	369	124	28	1,173	
	RD ₂	13	1,383	861	860	858	240	101	2,244	
	RD ₃	0	81	248	247	242	138	18	329	
	All	15	2,268	1,478	1,476	1,469	502	147	3,746	
All	RD ₁	8	3,741	3,031	3,031	3,027	1,012	572	6,772	
	RD ₂	45	5,920	4,714	4,712	4,704	1,300	927	10,634	
	RD ₃	16	1,781	1,838	1,837	1,830	903	727	3,619	
	All	69	11,369	9,500	9,498	9,479	3,166	2,227	20,939	

Table 14. Summary of biological data collected during the 2003 traditional survey excluding recovered tagged fish.

Locality	Mean fork length (mm)				Proportion	
	Males	Females	Sexes combined	Tagged	Males	Males
Langara Island-North Frederick	617	677	653	606		0.40
Hippa Island	598	661	636	636		0.40
Buck Point	610	670	641	619		0.48
Gowgaia Bay	620	658	645	687		0.33
Cape St. James	610	644	631	638		0.38
Triangle Island	573	629	596	598		0.59
Quatsino Sound	586	647	619	607		0.46
Esperanza Inlet	600	644	628	621		0.36
Barkley Canyon	588	635	618	628		0.36
Mean	600	652	630	627		0.42
Offshore Tagging						
Rennell Sound	-	-	-	604		-
Tasu Sound	-	-	-	621		-
Middle Ground	-	-	-	560		-
Pisces Canyon	-	-	-	628		-
Estevan Point	-	-	-	593		-
Father Charles Canyon	-	-	-	648		-
Mean	-	-	-	609		-
Mainland Inlet						
Portland Inlet	556	593	581	583		0.33
Gil Island	562	599	584	588		0.42
Finlayson Channel	563	608	593	595		0.34
Dean/Burke Channel	528	563	553	549		0.30
Mean	552	591	577	579		0.35
Overall Mean	576	621	604	605		0.38

Table 15. Summary of biological data collected during the 2003 random survey excluding recovered tagged fish.

Stratum		Mean fork length (mm)			Proportion	
Spatial	Depth	Males	Females	Sexes combined	Tagged	Males
S ₁	RD ₁	577	621	602	600	0.42
	RD ₂	560	594	571	570	0.66
	RD ₃	550	623	587	596	0.49
	All	567	615	590	590	0.51
S ₂	RD ₁	579	647	628	647	0.27
	RD ₂	592	624	603	601	0.65
	RD ₃	550	621	569	566	0.72
	All	576	634	601	602	0.57
S ₃	RD ₁	579	616	601	599	0.40
	RD ₂	587	632	602	606	0.64
	RD ₃	604	677	626	620	0.69
	All	590	633	608	607	0.58
S ₄	RD ₁	608	633	628	618	0.19
	RD ₂	610	634	623	615	0.44
	RD ₃	587	699	641	629	0.51
	All	606	641	627	617	0.40
S ₅	RD ₁	547	601	574	562	0.50
	RD ₂	586	629	606	601	0.53
	RD ₃	624	678	650	636	0.51
	All	583	630	606	589	0.52
All	RD ₁	575	628	608	602	0.36
	RD ₂	588	626	604	603	0.58
	RD ₃	577	657	605	595	0.64
	All	583	631	606	601	0.53

Table 16. Summary of species other than sablefish sampled during the 2003 survey.

Vessel	Species	Set	Catch		Length	Sex	Number sampled for		
			Weight (kg)	Count			Maturity	Otoliths	Round Weight
Ocean Pearl	Shortraker rockfish	25	15	3	2	2	2	2	2
		48	3	1	1	1	1	1	1
		58	11	2	2	2	2	2	2
		60	10	3	4	4	4	4	4
		85	3	1	1	1	1	1	0
Viking Star	Skilfish	38	12	1	1	1	0	1	1
		23	77	1	1	1	0	vertebrae	1
	Pacific sleeper shark	43	17	1	1	1	0	vertebrae	1
		36	10	5	5	5	5	5	5
	Redbanded rockfish	43	1	1	1	1	1	1	1
		44	9	7	7	7	7	7	0
		64	12	8	9	9	9	9	9
		77	9	7	7	7	7	7	7
		83	11	4	4	4	4	4	4
		43	120	77	77	77	77	0	0
	Rougheye rockfish	55	36	24	24	24	24	24	24
		65	26	18	18	18	18	18	18
	Shortraker rockfish	45	6	2	2	2	2	2	0
		54	3	1	1	1	1	1	1
		66	6	1	1	1	1	1	1
		76	4	1	1	1	1	1	1
	Yelloweye rockfish	60	4	1	1	1	1	1	1

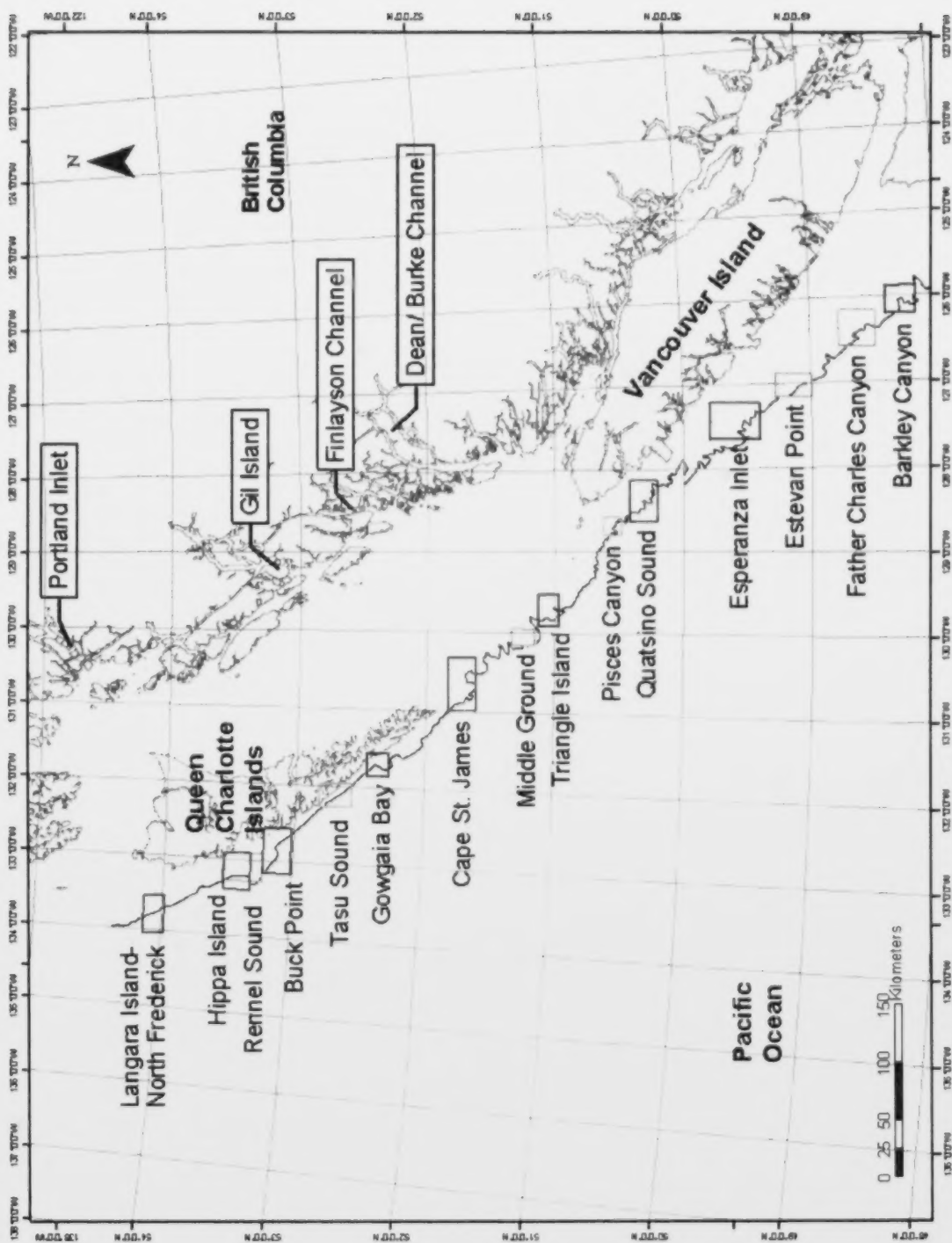


Figure 1. Geographic boundaries of the traditional survey localities. Blue boxes indicate an indexing locality, tagging localities are indicated by red boxes and green boxes indicate the locations within the mainland inlet localities. The 1000 m depth contour is shown.

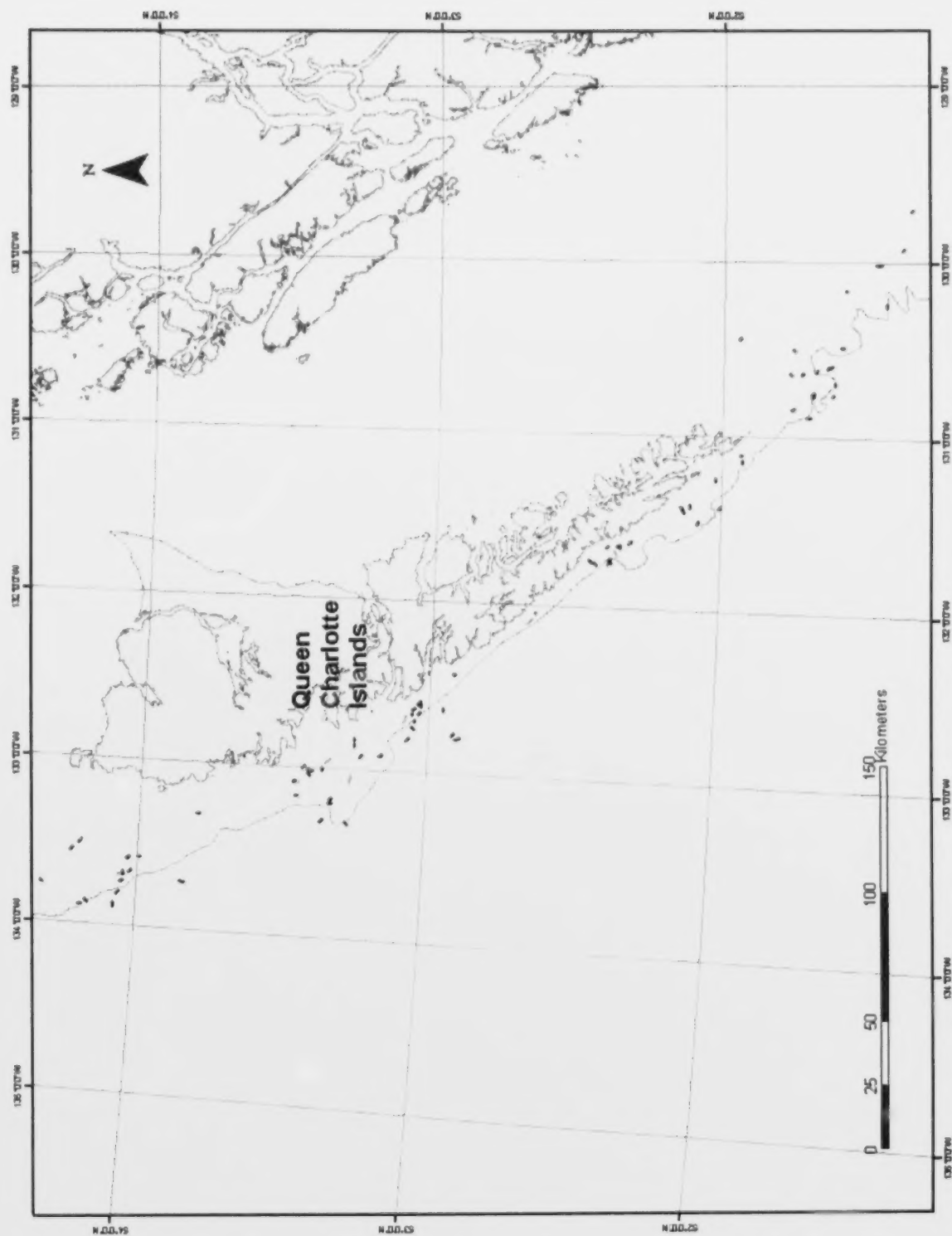


Figure 2. Locations of northern sets completed during the 2003 survey. Blue lines represent standardized survey sets while red lines represent Type 1 tagging sets and green lines represent Type 3 tagging sets. The 1000 m contour is shown.

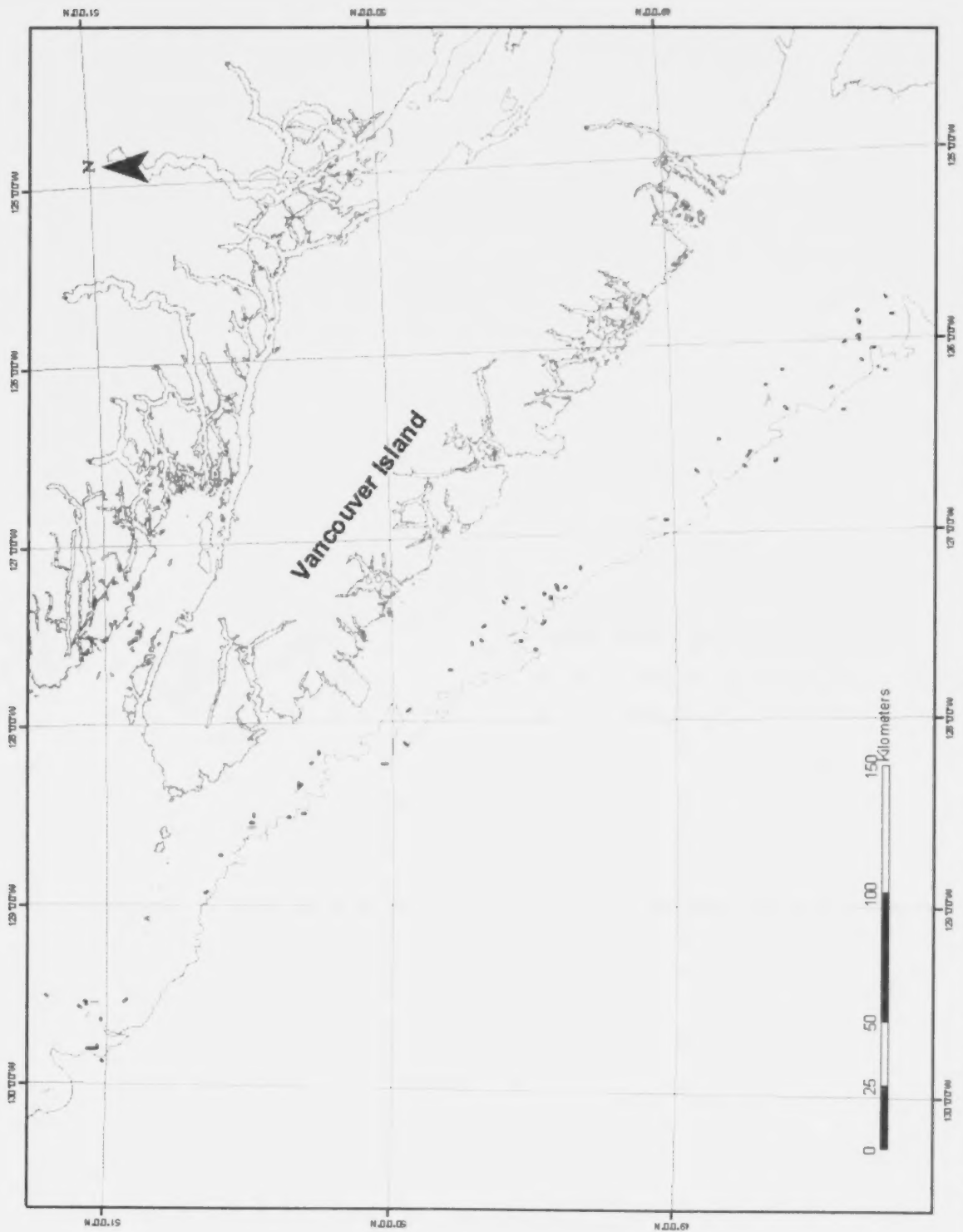


Figure 3. Locations of southern sets completed during the 2003 survey. Blue lines represent standardized survey sets while red lines represent Type 1 tagging sets and green lines represent Type 3 tagging sets. The 1000 m contour is shown.

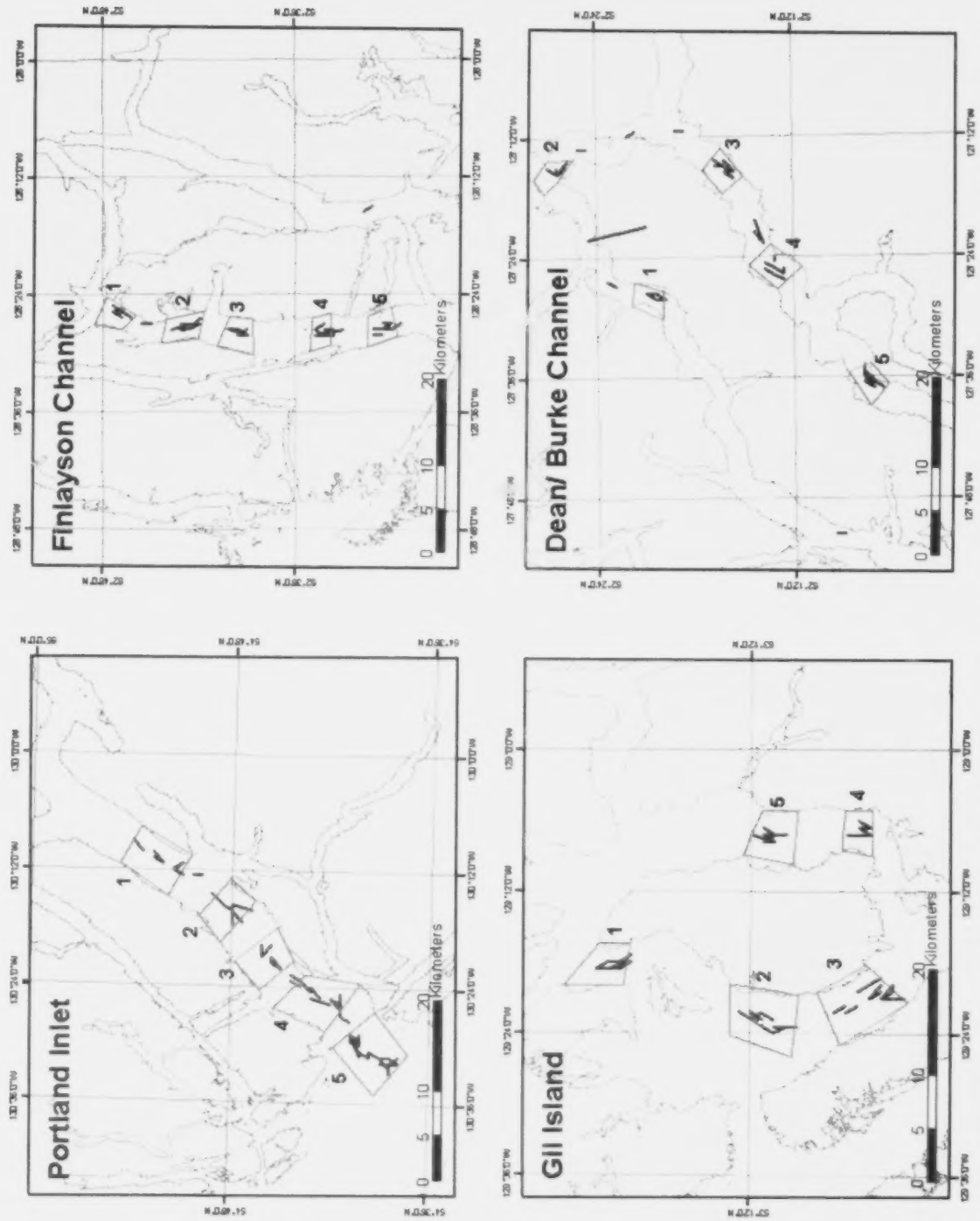


Figure 4. Each panel shows one of the four sablefish survey mainland inlet localities. Sets conducted from 1994 to 2002 are shown in black while the 2003 sets are shown in blue. The green polygons indicate the five specific set locations within each of the four localities.

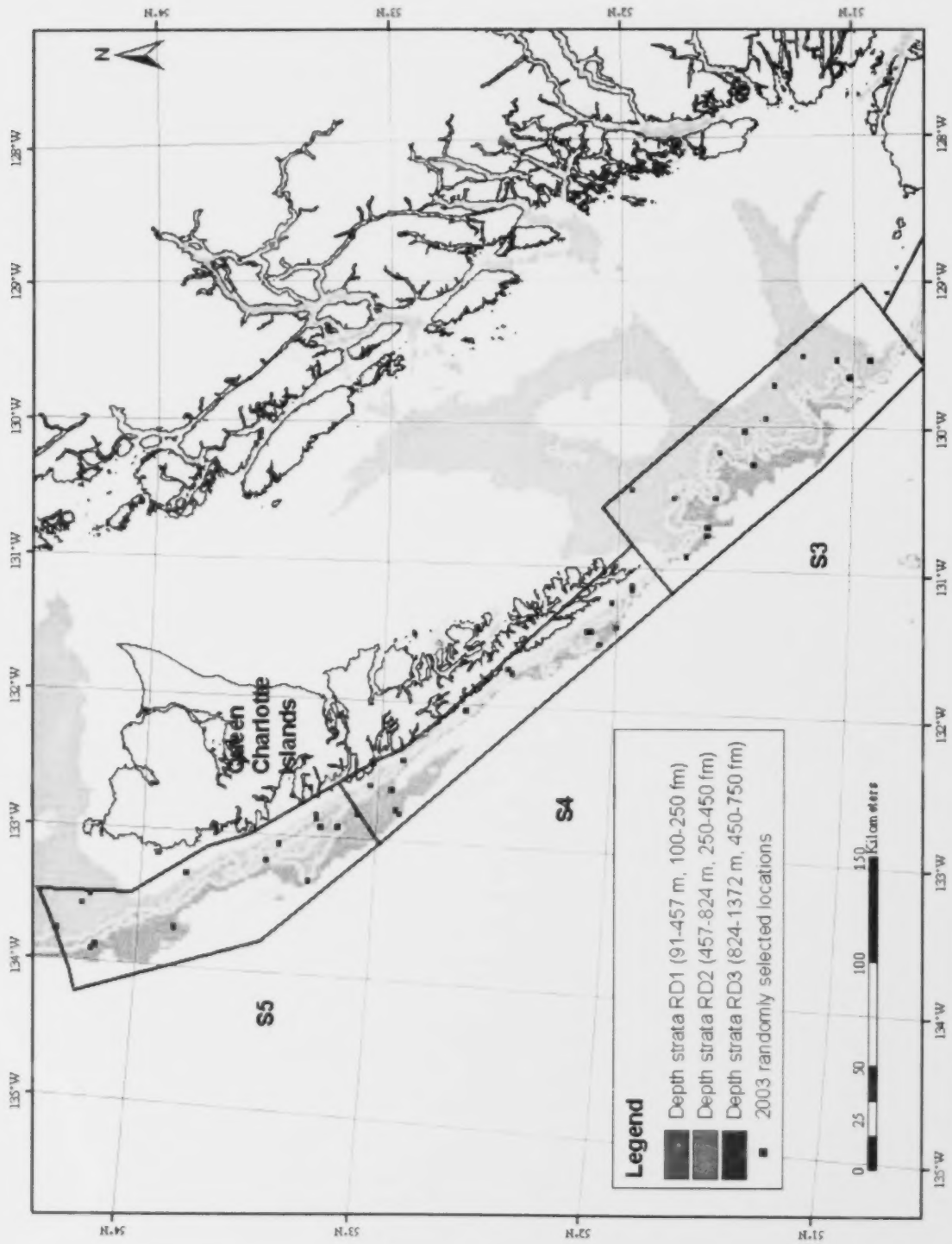


Figure 5. Northern area of the stratified random survey design. The boundaries of the three northern spatial strata (S₃-S₅) and the three depth strata (RD₁-RD₃) are shown. Black squares indicate the randomly selected 2 km by 2 km sampling units for the 2003 survey.

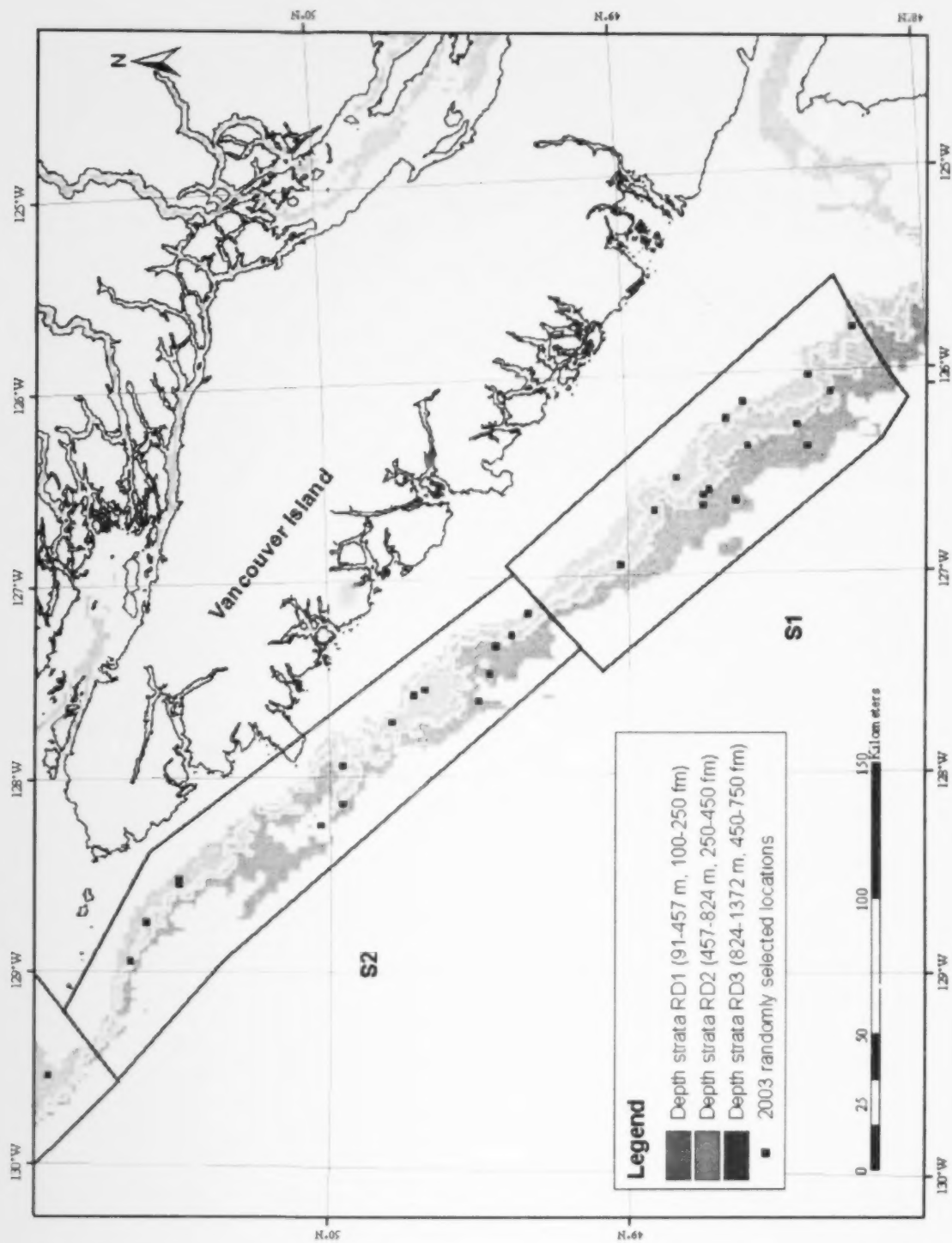


Figure 6. Southern area of the stratified random survey design. The boundaries of the two southern spatial strata (S₁-S₂) and the three depth strata (RD₁-RD₃) are shown. Black squares indicate the randomly selected 2 km by 2 km sampling units for the 2003 survey.

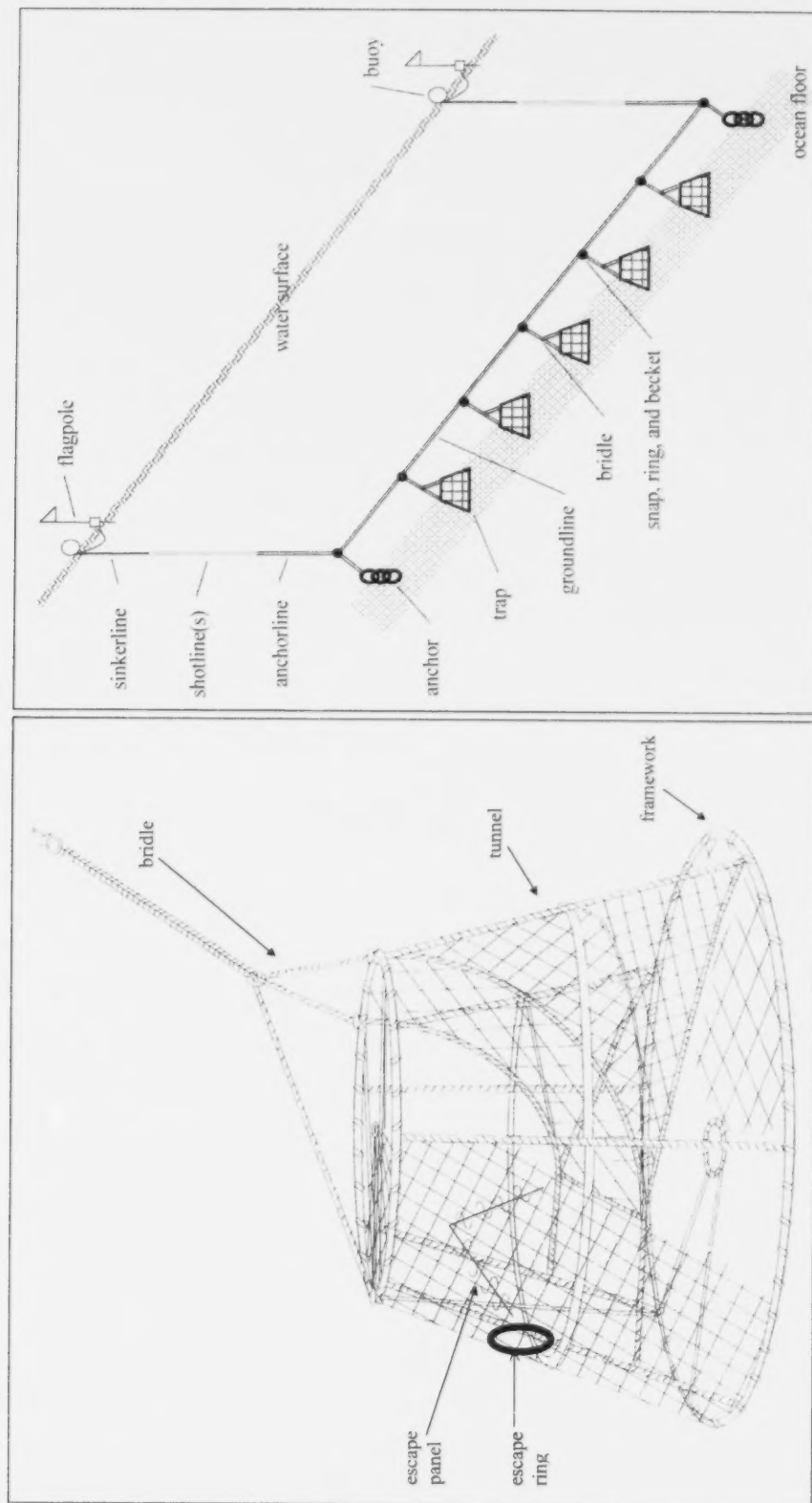


Figure 7. Diagrams of fishing gear used during the 2003 survey. The left panel shows a modified Korean trap of the kind used during the 2003 survey. The right panel shows the components of a set or string of trap gear.

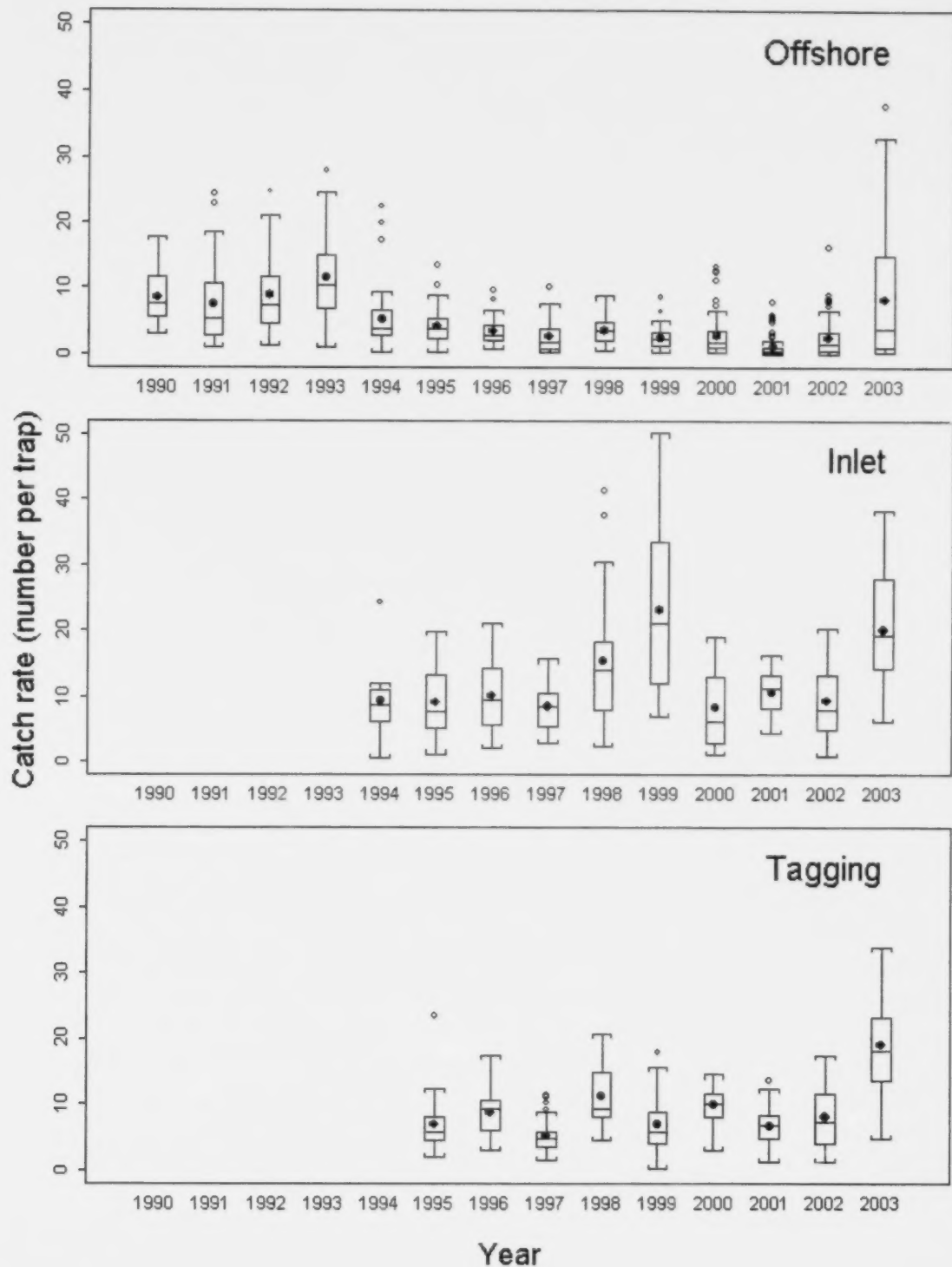


Figure 8. Annual distributions of catch rates for standardized sets conducted at offshore indexing localities, standardized sets conducted at mainland inlet localities, and Type 1 tagging sets conducted at both offshore tagging and indexing localities summarised by boxplots. The filled circles show the mean annual catch rates. The shaded rectangles indicate an approximate 95 percent confidence interval on the median annual catch rate.

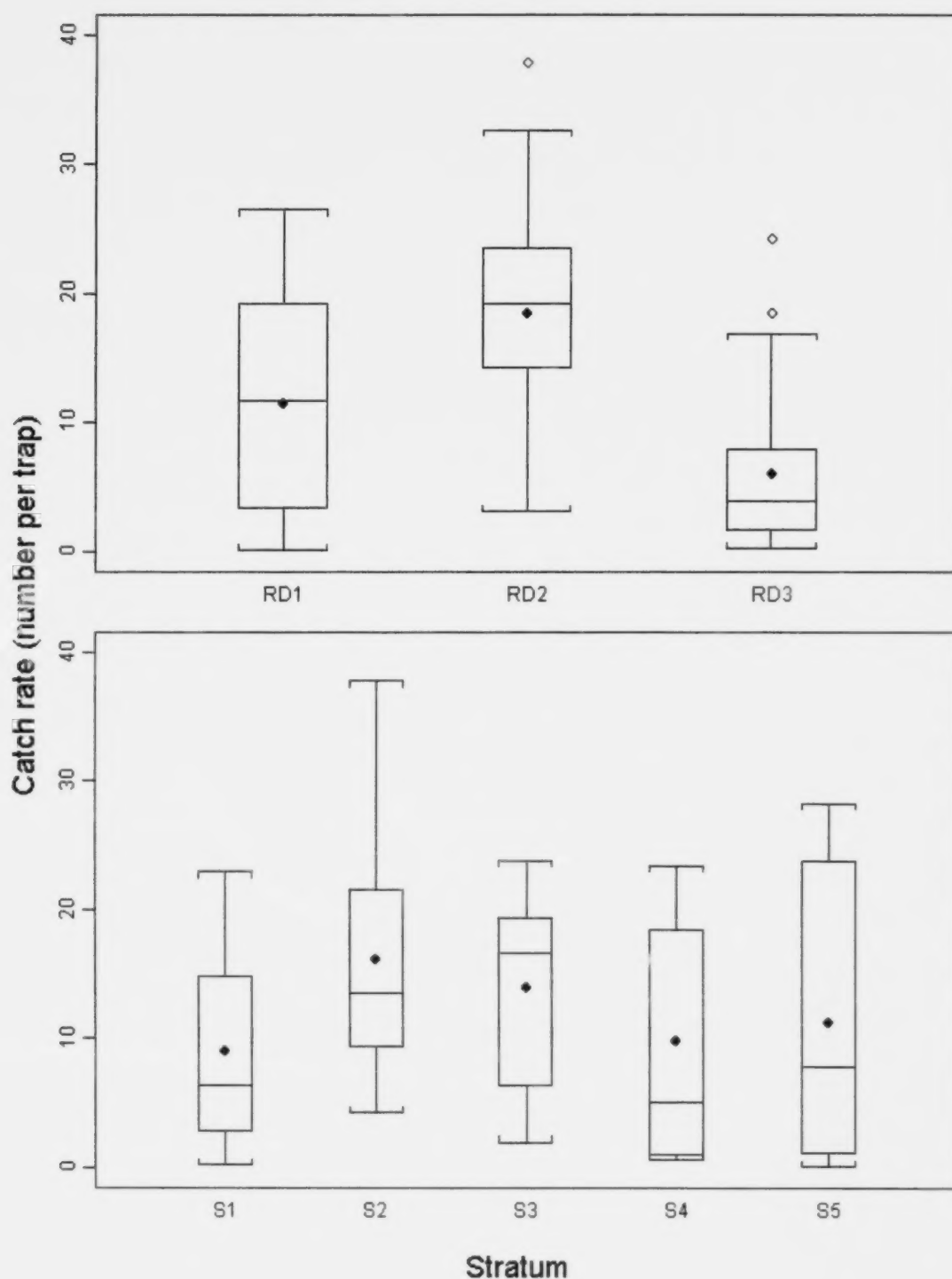


Figure 9. Distribution of catch rates for Type 3 tagging sets summarised by a boxplot for each spatial (S_1 - S_5) and depth (RD_1 - RD_3) stratum. The filled circles show the mean stratum catch rates. The shaded rectangles indicate an approximate 95 percent confidence interval on the median stratum catch rate.

APPENDIX A DETAILS OF SETS COMPLETED DURING THE 2003 STANDARDIZED SURVEY CHARTER (VIKING STAR).

Sets are listed sequentially by the start date. The locality name, the replicate, the start date and time as well as the duration in minutes are shown for each set. Position data include the Groundfish Major, Minor, and Locality coding as well as the start and end latitude and longitude in degrees and decimal minutes. The bottom depth (m) at the start and end of the set are shown. The mean bottom depth is calculated from recordings at one minute intervals between the start and end of the set. The number of traps fished is also shown and excludes only open traps, while holed or fouled traps are included. All sets were baited with approximately one kilogram of frozen squid in a bait bag in each trap.

Locality	Set	Target Strata	Date	Time	Duration (min)	Area (Maj-Min-Loc)	Start		End		Bottom Depth (m)		Traps Fished
							Latitude	Longitude	Latitude	Longitude	Start	End	
Barkley Canyon	1	D0	09-Oct-03	1129	1353	03-23-10	48 20.3	125 51.4	48 21.0	125 52.1	176	187	188 25
	2	D1	09-Oct-03	1216	1549	03-23-10	48 20.3	125 55.8	48 19.9	125 55.0	386	468	443 25
	3	D2	09-Oct-03	1348	1566	03-23-13	48 13.6	125 53.3	48 13.1	125 53.2	503	527	516 23
	4	D3	09-Oct-03	1524	1586	03-23-10	48 20.0	125 59.7	48 20.1	125 58.8	845	777	814 25
	5	D4	09-Oct-03	1614	1591	03-23-10	48 20.3	126 00.6	48 20.4	125 59.7	850	796	830 25
	6	D5	09-Oct-03	1705	1618	03-23-10	48 17.5	126 03.4	48 17.0	126 03.4	1037	1059	1050 20
	7	D7	09-Oct-03	1838	1692	03-23-	48 15.6	126 10.6	48 14.9	126 10.7	1138	1576	1564 26
Esperanza Inlet	8	D6	09-Oct-03	1905	1732	03-23-	48 16.3	126 10.1	48 16.6	126 09.2	1280	1298	1315 25
	9	D0	13-Oct-03	1803	1227	04-25-3	49 36.4	127 20.0	49 35.9	127 20.5	168	294	230 25
	10	D2	13-Oct-03	1920	1275	04-26-8	49 40.8	127 29.1	49 41.1	127 29.7	541	490	514 25
	11	D1	13-Oct-03	2038	1292	04-25-3	49 36.7	127 21.2	49 36.5	127 22.1	287	357	331 25
	12	D3	13-Oct-03	2249	1331	04-25-4	49 24.9	127 18.2	49 25.4	127 16.6	644	666	666 26
	13	D4	13-Oct-03	2330	1385	04-25-4	49 27.7	127 18.8	49 27.7	127 19.7	885	991	931 25
	14	D5	14-Oct-03	0037	1428	04-25-4	49 32.8	127 23.7	49 32.1	127 23.8	1024	1035	1033 25
Dean/Burke Channel	15	D6	14-Oct-03	0210	1445	04-26-8	49 33.1	127 34.5	49 32.5	127 34.7	1225	1244	1234 25
	16		17-Oct-03	0822	1018	06-08-8	52 07.2	127 37.4	52 07.6	127 36.7	419	450	422 24
	17		17-Oct-03	0948	1120	06-08-8	52 13.3	127 25.9	52 13.9	127 25.3	591	593	593 24
	18		17-Oct-03	1053	1158	06-08-8	52 16.1	127 16.6	52 16.5	127 15.8	580	582	582 25
	19		17-Oct-03	1253	1173	06-08-8	52 26.7	127 16.0	52 27.3	127 15.5	532	512	545 25
	20		17-Oct-03	1431	1246	06-08-8	52 21.2	127 27.9	52 20.6	127 28.3	499	514	494 25
	21		18-Oct-03	1952	1005	07-07-3	52 29.3	128 27.2	52 30.4	128 27.6	715	828	777 24
Finlayson Channel	22		18-Oct-03	2033	1067	07-07-3	52 33.9	128 27.9	52 34.6	128 27.8	649	680	657 24
	23		18-Oct-03	2123	1144	07-07-3	52 39.0	128 28.4	52 39.6	128 28.4	574	625	618 24

Locality	Target		Duration (min)	Area (Maj-Min-Loc)	Start		End		Bottom Depth (m)		Traps Mean
	Set	Strata Date	Time		Latitude	Longitude	Latitude	Longitude	Start	End	
Gill Island	24	18-Oct-03	2204	1255	07-07-3	52 42.4	128 26.8	52 42.7	128 27.7	510	492
	25	18-Oct-03	2255	1312	07-07-3	52 46.7	128 26.6	52 47.2	128 26.0	607	591
	26	20-Oct-03	0724	1060	07-06-6	53 11.7	129 07.8	53 11.0	129 07.6	563	571
	27	20-Oct-03	0805	1820	07-06-6	53 07.2	129 07.7	53 06.5	129 07.3	567	552
	28	20-Oct-03	0924	1884	07-06-6	53 05.4	129 21.2	53 05.0	129 20.3	677	684
Portland Inlet	29	20-Oct-03	1056	1920	07-06-6	53 12.6	129 22.8	53 11.8	129 23.4	541	543
	30	20-Oct-03	1243	1968	07-06-6	53 18.8	129 18.3	53 18.2	129 17.8	539	543
	31	22-Oct-03	2022	987	08-04-12	54 51.3	130 12.7	54 51.9	130 12.1	437	437
	32	22-Oct-03	2129	1050	08-04-12	54 47.8	130 17.5	54 48.3	130 16.5	486	485
	33	22-Oct-03	2236	1063	08-04-12	54 45.2	130 22.5	54 45.6	130 21.6	558	514
Langara Island- North Frederick	34	22-Oct-03	2345	1079	08-04-12	54 41.8	130 27.1	54 42.0	130 24.9	618	547
	35	23-Oct-03	0057	1109	08-04-10	54 38.3	130 32.2	54 39.0	130 32.1	605	642
	36	26-Oct-03	1256	1310	09-35-2	54 02.4	133 36.4	54 01.9	133 35.8	265	252
	37	26-Oct-03	1338	1184	09-31-2	53 59.6	133 35.4	54 00.2	133 36.0	448	470
	38	26-Oct-03	1445	1410	09-35-6	54 03.5	133 42.1	54 03.6	133 41.0	587	463
Hippa Island	39	26-Oct-03	1525	1237	09-35-2	54 01.5	133 40.6	54 02.1	133 41.2	680	660
	40	26-Oct-03	1556	1457	09-35-6	54 03.2	133 44.0	54 03.7	133 44.7	836	834
	41	26-Oct-03	1630	1491	09-35-	54 04.2	133 48.1	54 04.2	133 49.4	1008	1077
	42	26-Oct-03	1702	1540	09-35-	54 05.1	133 52.6	54 05.1	133 54.2	1189	1207
	43	28-Oct-03	2049	1211	09-31-1	53 28.3	133 05.8	53 27.7	133 04.9	454	530
Buck Point	44	28-Oct-03	2133	1271	09-31-1	53 26.5	133 00.8	53 25.9	132 60.0	243	369
	45	28-Oct-03	2220	1322	09-31-1	53 25.2	133 01.5	53 24.5	133 01.6	567	569
	46	28-Oct-03	2306	1406	09-31-1	53 22.8	133 01.3	53 22.4	133 00.4	669	671
	47	29-Oct-03	0110	1401	09-31-14	53 20.8	133 11.4	53 20.2	133 11.1	823	894
	48	29-Oct-03	0159	1410	09-31-14	53 20.9	133 13.1	53 20.2	133 13.2	1052	1031
Gowgaia Bay	49	29-Oct-03	0309	1480	09-31-	53 22.4	133 19.6	53 21.8	133 19.2	1280	1189
	50	30-Oct-03	0813	1430	09-31-	53 03.9	132 44.4	53 03.5	132 45.2	1244	1247
	51	30-Oct-03	0855	1637	09-31-8	53 03.3	132 43.1	53 03.0	132 42.1	1147	1108
	52	30-Oct-03	0947	1651	09-31-8	53 02.5	132 39.9	53 02.0	132 39.1	999	949
	53	30-Oct-03	1034	1681	09-31-3	53 04.1	132 40.8	53 03.6	132 40.0	655	636
	54	30-Oct-03	1112	1745	09-31-8	53 01.9	132 37.1	53 02.4	132 37.6	607	538
	55	30-Oct-03	1143	1828	09-31-3	53 03.7	132 38.9	53 03.2	132 38.3	424	452
	56	30-Oct-03	1219	1932	09-31-8	53 02.2	132 35.6	53 02.7	132 36.2	225	221
	57	01-Nov-03	1750	1376	09-34-3	52 23.4	131 45.8	52 23.5	131 44.7	1353	1191
	58	01-Nov-03	1824	1413	09-34-3	52 23.2	131 45.0	52 23.1	131 45.1	1011	1273

Locality	Target		Duration (min)	Area (Maj-Min-Loc)	Start		End		Bottom Depth (m)		Traps
	Set	Strata Date			Latitude	Longitude	Latitude	Longitude	Start	End	
Cape St. James	59	D4	01-Nov-03	1907	52 23.7	131 43.9	52 23.2	131 43.2	989	924	962 25
	60	D0	01-Nov-03	2040	52 24.5	131 40.0	52 23.8	131 39.5	208	230	208 25
	61	D1	01-Nov-03	2305	52 21.0	131 38.9	52 21.6	131 39.4	450	437	417 25
	62	D2	01-Nov-03	2355	52 21.1	131 39.4	52 21.6	131 39.9	640	516	547 23
	63	D3	02-Nov-03	0113	52 18.9	131 37.5	52 19.5	131 38.0	814	770	715 25
	64	D0	03-Nov-03	0743	51 45.7	130 51.6	51 45.4	130 50.5	274	265	269 25
	65	D1	03-Nov-03	0855	51 41.8	130 46.1	51 41.2	130 45.6	444	446	441 25
	66	D2	03-Nov-03	1012	51 41.5	130 46.4	51 41.0	130 45.6	508	481	488 25
	67	D3	03-Nov-03	1142	51 46.2	130 38.7	51 45.7	130 39.6	646	689	666 24
	68	D4	03-Nov-03	1213	51 43.9	130 39.3	51 43.3	130 38.9	823	863	845 25
Triangle Island	69	D5	03-Nov-03	1246	51 41.0	130 37.8	51 40.3	130 37.4	1011	1059	1035 24
	70	D6	03-Nov-03	1320	51 38.5	130 36.6	51 37.7	130 36.1	1187	1236	1209 26
	71	D5	05-Nov-03	0556	51 03.5	129 49.0	51 04.2	129 49.0	1097	1006	1006 24
	72	D6	05-Nov-03	0752	51 00.8	129 52.8	51 01.4	129 52.7	1284	1200	1244 26
	73	D4	05-Nov-03	0845	51 03.2	129 48.7	51 02.7	129 49.0	887	790	839 25
	74	D3	05-Nov-03	0912	51 02.3	129 47.8	51 02.0	129 48.8	640	693	671 25
	75	D2	05-Nov-03	1053	51 04.9	129 33.1	51 04.4	129 33.7	472	530	501 24
	76	D1	05-Nov-03	1132	51 05.4	129 32.5	51 05.0	129 33.5	415	483	452 25
	77	D0	05-Nov-03	1205	51 05.6	129 35.0	51 06.1	129 34.4	285	267	271 25
	78	D5	07-Nov-03	0452	50 22.5	128 31.3	50 21.8	128 31.4	1015	1130	1064 25
Quatsino Sound	79	D6	07-Nov-03	0536	50 18.8	128 30.1	50 19.4	128 30.3	1280	1189	1234 25
	80	D2	07-Nov-03	0644	50 20.3	128 20.9	50 20.4	128 21.9	547	759	625 25
	81	D3	07-Nov-03	0737	50 20.3	128 20.4	50 20.1	128 21.3	671	737	700 23
	82	D4	07-Nov-03	0810	50 19.6	128 20.7	50 19.8	128 21.6	836	845	839 25
	83	D0	07-Nov-03	0917	50 17.4	128 13.5	50 17.9	128 14.2	262	208	232 25
	84	D1	07-Nov-03	1019	50 15.7	128 09.7	50 15.7	128 10.8	437	457	452 25

APPENDIX B DETAILS OF SETS COMPLETED DURING THE 2003 TAGGING PROGRAM CHARTER (OCEAN PEARL).

Sets are listed sequentially by the start date. The locality name, the type of set (Type 1 traditional or Type 3 random), the start date and time as well as the duration in minutes are shown for each set. Position data include the Groundfish Major, Minor, and Locality coding as well as the start and end latitude and longitude in degrees and decimal minutes. The bottom depth (m) at the start and end of the set are shown. The mean bottom depth is calculated from recordings at one minute intervals between the start and end of the set. The number of traps fished is also shown and excludes only open traps, while holed or fouled traps are included. All sets were baited with approximately one kilogram of frozen squid in a bait bag and 3 kg of frozen Pacific hake loose in each trap.

Locality	Set	Type	Stratum		Duration (min)	Area	Start		End		Bottom Depth (m)		Traps Fished
			Spatial	Depth			(Maj-Min-Loc)	Latitude	Longitude	Latitude	Longitude	Start	
Barkley Canyon	1	1			1344	1420	03-23-10	48 20.1	125 55.8	48 20.7	125 53.9	462 298	356 62
	2	1			1750	1684	03-23-12	48 40.3	126 20.4	48 39.8	126 18.5	526 395	468 64
Father Charles Canyon	3	3	S ₁	RD ₃	0555	1530	03-23-0	48 23.8	126 22.3	48 24.5	126 22.3	1177 1150	1159 24
	4	3	S ₁	RD ₂	0829	1691	03-23-10	48 19.2	126 07.2	48 20.2	126 07.0	801 623	718 25
Random Design	5	3	S ₁	RD ₁	1122	1725	03-23-13	48 14.7	125 47.1	48 14.3	125 47.7	309 318	305 25
	6	3	S ₁	RD ₁	1600	1616	03-23-10	48 23.0	126 00.8	48 23.6	126 01.3	367 259	321 22
	7	3	S ₁	RD ₂	1725	1715	03-23-10	48 25.8	126 15.4	48 26.4	126 15.9	768 771	773 25
	8	3	S ₁	RD ₁	1928	1738	03-23-12	48 36.3	126 09.5	48 36.8	126 09.1	224 181	230 25
	9	3	S ₁	RD ₁	2023	1801	03-23-12	48 39.8	126 13.9	48 40.3	126 14.3	199 193	193 25
	10	1			0055	2322	03-23-12	48 39.9	126 16.2	48 39.6	126 18.9	329 429	391 65
Father Charles Canyon	11	3	S ₁	RD ₃	1006	3370	03-24-6	48 44.4	126 36.0	48 44.7	126 37.0	875 832	866 24
	12	3	S ₁	RD ₃	1047	3223	03-24-0	48 44.9	126 40.0	48 45.5	126 39.2	1183 1058	1152 26
Random Design	13	3	S ₁	RD ₃	1148	3052	03-24-6	48 43.5	126 35.3	48 44.3	126 35.1	844 963	907 25
	14	3	S ₁	RD ₃	1319	2825	03-24-0	48 38.3	126 37.8	48 38.9	126 38.5	1333 1340	1338 26
	15	3	S ₁	RD ₂	1852	2322	03-23-12	48 35.5	126 21.6	48 36.1	126 21.5	790 766	771 25
	16	3	S ₁	RD ₁	2056	1981	03-24-7	48 49.9	126 30.6	48 50.6	126 30.8	215 212	212 24
	17	3	S ₁	RD ₂	2032	1544	03-24-7	48 55.3	126 40.3	48 55.0	126 41.3	555 521	532 24
	18	3	S ₁	RD ₂	2212	1613	04-25-1	49 01.2	126 56.2	49 01.9	126 56.2	669 623	645 25
Estevan Point	19	1			2258	1003	04-25-1	49 03.6	126 55.7	49 05.4	126 55.6	488 396	433 62
	20	3	S ₂	RD ₃	0906	1794	04-26-0	49 29.8	127 37.7	49 30.4	127 37.8	1002 994	1022 24
Random Design	21	3	S ₂	RD ₃	1020	1560	04-25-4	49 28.4	127 29.3	49 28.0	127 28.1	965 1060	1004 26
	22	3	S ₂	RD ₃	1123	1365	04-25-4	49 26.8	127 21.1	49 26.5	127 20.3	950 918	894 25
	23	3	S ₂	RD ₁	0741	1318	04-25-2	49 20.1	127 10.7	49 19.8	127 11.6	213 267	237 24

Locality	Stratum			Duration (min)	Area	Start		End		Bottom Depth (m)		Traps Fished				
	Set	Type	Spatial Depth			Time	(Maj-Min-Loc)	Latitude	Longitude	Latitude	Longitude		Start	End	Mean	
Random Design	24	3	S ₂	RD ₂	23-Oct-03	0836	1370	04-25-4	49 23.1	127 17.1	49 23.8	127 17.8	543	559	546	26
Esperanza Inlet	25	1			23-Oct-03	1643	1170	04-26-8	49 34.0	127 31.5	49 35.6	127 32.6	636	594	537	65
Random Design	26	3	S ₂	RD ₂	23-Oct-03	1811	1250	04-26-8	49 40.9	127 34.2	49 41.6	127 33.6	555	491	524	25
	27	3	S ₂	RD ₁	23-Oct-03	1905	1327	04-26-8	49 43.4	127 34.4	49 43.3	127 35.4	402	433	415	23
	28	3	S ₂	RD ₂	23-Oct-03	2038	1344	04-26-4	49 47.6	127 43.7	49 48.1	127 43.4	581	464	499	25
	29	3	S ₂	RD ₂	25-Oct-03	0601	1418	04-26-5	49 57.0	127 56.2	49 57.3	127 57.3	457	457	471	25
	30	3	S ₂	RD ₃	25-Oct-03	0714	1489	04-27-7	49 57.3	128 08.1	49 57.9	128 06.9	881	879	859	24
	31	3	S ₂	RD ₃	25-Oct-03	0810	1594	04-27-7	50 01.7	128 14.1	50 02.6	128 14.3	1106	846	1018	25
Quatsino Sound	32	1			25-Oct-03	1054	1632	04-27-3	50 21.2	128 23.1	50 20.2	128 22.8	316	810	535	64
Random Design	33	3	S ₂	RD ₁	26-Oct-03	1605	1322	04-27-3	50 29.6	128 30.5	50 29.9	128 31.3	195	197	195	24
	34	3	S ₂	RD ₁	26-Oct-03	1642	1357	04-27-3	50 29.5	128 33.5	50 30.2	128 33.1	265	202	248	25
Pisces Canyon	35	1			26-Oct-03	1727	873	05-11-11	50 31.0	128 35.2	50 29.5	128 35.2	376	671	616	64
Pisces Canyon	36	1			26-Oct-03	1827	1018	05-11-11	50 29.3	128 34.7	50 30.8	128 34.5	325	398	416	65
Random Design	37	3	S ₂	RD ₁	26-Oct-03	2035	1314	05-11-6	50 36.9	128 44.3	50 36.4	128 44.0	221	221	221	25
	38	3	S ₂	RD ₂	26-Oct-03	2205	1370	05-11-11	50 39.3	128 55.9	50 39.8	128 56.9	460	548	544	24
	39	3			28-Oct-03	0749	1457	05-11-7	50 56.5	129 33.4	50 56.2	129 32.2	239	230	234	25
	40	3	S ₃	RD ₃	28-Oct-03	0922	1507	05-11-7	51 01.2	129 38.9	51 01.7	129 39.3	947	901	940	25
Triangle Island	41	1			28-Oct-03	1029	468	05-11-7	51 05.0	129 38.4	51 03.7	129 36.9	579	557	577	64
Triangle Island	42	1			28-Oct-03	1130	1498	05-11-7	51 02.3	129 33.6	51 03.7	129 33.2	603	583	590	66
Random Design	43	3	S ₃	RD ₂	28-Oct-03	1231	1589	05-11-7	51 04.8	129 32.8	51 04.2	129 33.1	486	512	473	25
	44	3	S ₃	RD ₁	28-Oct-03	1429	1680	05-11-12	51 13.0	129 31.6	51 13.3	129 30.7	296	296	296	24
Middle Ground	45	1			29-Oct-03	0414	2336	05-11-12	51 13.8	130 03.5	51 12.2	130 02.8	601	590	594	64
Random Design	46	3	S ₃	RD ₁	29-Oct-03	2115	2796	06-08-10	51 20.5	129 42.8	51 21.1	129 43.3	206	213	210	24
	47	3	S ₃	RD ₁	29-Oct-03	2230	2827	06-08-10	51 22.5	129 56.0	51 22.9	129 56.7	248	248		25
	48	3	S ₃	RD ₂	30-Oct-03	0953	1429	06-08-15	51 35.7	130 29.5	51 35.0	130 29.6	566	610	588	25
	49	3	S ₃	RD ₂	30-Oct-03	1223	1433	06-08-14	51 34.9	130 10.7	51 34.2	130 10.3	718	791	758	25
	50	3	S ₃	RD ₂	30-Oct-03	1404	1611	06-08-10	51 28.2	130 01.7	51 27.6	130 01.8	700	696	652	25
	51	3	S ₃	RD ₃	30-Oct-03	1534	1369	06-08-15	51 26.0	130 14.8	51 26.0	130 15.7	877	846	835	25
	52	3	S ₃	RD ₁	31-Oct-03	0611	1439	06-08-6	51 57.3	130 27.2	51 56.7	130 26.7	420	396	409	25
	53	3	S ₃	RD ₂	31-Oct-03	0754	1497	06-08-6	51 45.9	130 30.6	51 45.2	130 30.8	539	640	585	26
Cape St. James	54	1			01-Nov-03	1114	1353	06-08-12	51 41.7	130 45.9	51 41.7	130 48.6	420	848	713	59
Random Design	55	3	S ₃	RD ₃	01-Nov-03	1244	1437	06-08-12	51 37.0	130 41.8	51 36.8	130 42.8	822	991	918	25
	56	3	S ₃	RD ₃	01-Nov-03	1337	1484	06-08-12	51 37.5	130 46.7	51 36.9	130 46.2	1051	1060	1046	25
	57	3	S ₃	RD ₃	01-Nov-03	1539	1496	06-08-0	51 42.6	130 53.8	51 42.0	130 53.7	1044	1296	1130	24
	58	3	S ₄	RD ₁	02-Nov-03	0425	1517	09-34-1	52 01.4	131 15.6	52 01.5	131 14.6	250	243	246	26

Locality	Set	Type	Spatial	Stratum	Depth	Date	Time	Duration (min)	Area (Maj-Min-Loc)	Start			End			Bottom Depth (m)		Traps Mean Fished
										Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	Start	End	
Random Design	59	3	S ₄	RD ₁	02-Nov-03	0558	1525	06-08-12	51 56.8	131 06.8	51 56.2	131 06.6	228	226	223	223	25	25
	60	3	S ₄	RD ₂	02-Nov-03	0637	1589	06-08-12	51 55.8	131 09.0	51 55.8	131 09.9	480	541	519	519	25	25
	61	3	S ₄	RD ₃	02-Nov-03	2059	1321	09-34-1	52 00.3	131 25.0	52 00.7	131 25.7	1373	1078	1185	1185	22	22
	62	3	S ₄	RD ₃	02-Nov-03	2217	1375	09-34-1	52 05.0	131 30.9	52 05.0	131 29.8	1367	1274	1302	1302	25	25
	63	3	S ₄	RD ₂	02-Nov-03	2318	1416	09-34-1	52 07.1	131 24.2	52 07.0	131 25.4	502	746	662	662	25	25
	64	3	S ₄	RD ₂	02-Nov-03	2359	1549	09-34-1	52 08.3	131 27.1	52 08.4	131 24.9	570	749	634	634	25	25
Gowgaia Bay Random Design	65	1	S ₄		04-Nov-03	0941	1749	09-34-3	52 22.7	131 40.7	52 22.1	131 42.9	683	1137	972	972	50	50
	66	3	S ₄	RD ₂	04-Nov-03	1102	1420	09-34-3	52 27.0	131 45.4	52 26.4	131 45.8	550	744	733	733	25	25
	67	3	S ₄	RD ₁	04-Nov-03	1145	1500	09-34-3	52 28.1	131 44.3	52 27.5	131 45.1	140	427	235	235	25	25
Tasu Sound Random Design	68	1	S ₄		04-Nov-03	1434	1761	09-34-4	52 39.2	132 05.1	52 40.4	132 06.6	493	667	621	621	61	61
	69	3	S ₄	RD ₁	05-Nov-03	0805	1462	09-34-4	52 38.5	132 03.6	52 38.5	132 02.6	384	221	254	254	24	24
	70	3	S ₄	RD ₂	06-Nov-03	1137	1321	09-31-5	52 55.0	132 25.7	52 55.3	132 25.5	623	566	599	599	24	24
Buck Point Random Design	71	3	S ₄	RD ₁	06-Nov-03	1316	1369	09-31-8	53 02.2	132 36.4	53 02.6	132 37.2	374	404	369	369	25	25
	72	1	S ₄		06-Nov-03	1405	441	09-31-3	53 04.9	132 40.6	53 05.8	132 43.4	473	722	623	623	25	25
	73	3	S ₄	RD ₃	06-Nov-03	1627	1315	09-31-0	52 57.2	132 37.4	52 57.1	132 38.7	1353	1347	1349	1349	25	25
Rennell Sound Random Design	74	3	S ₄	RD ₃	06-Nov-03	1733	1390	09-31-0	52 55.4	132 47.3	52 54.9	132 46.6	969	998	983	983	25	25
	75	3	S ₄	RD ₃	06-Nov-03	1806	1451	09-31-0	52 54.0	132 47.8	52 54.6	132 48.3	1172	1141	1146	1146	23	23
	76	3	S ₅	RD ₃	07-Nov-03	2052	1325	09-31-0	53 04.6	132 48.4	53 05.0	132 49.4	1232	1232	1230	1230	25	25
	77	3	S ₅	RD ₂	07-Nov-03	2203	1384	09-31-7	53 09.7	132 54.9	53 10.4	132 55.5	790	775	779	779	25	25
	78	3	S ₅	RD ₁	07-Nov-03	2257	1453	09-31-14	53 14.2	132 55.2	53 14.8	132 55.9	349	277	310	310	26	26
	79	1	S ₅		07-Nov-03	2348	578	09-31-14	53 16.2	133 02.4	53 16.3	133 05.4	493	629	563	563	64	64
Rennell Sound Random Design	80	3	S ₅	RD ₃	08-Nov-03	1200	1974	09-31-0	53 16.5	133 19.8	53 17.0	133 18.6	1055	940	1038	1038	25	25
	81	1	S ₅		08-Nov-03	1415	2525	09-31-1	53 20.8	132 57.3	53 22.1	132 58.8	537	612	544	544	59	59
	82	3	S ₅	RD ₂	08-Nov-03	1550	1390	09-31-15	53 15.8	132 52.3	53 15.9	132 51.2	665	625	647	647	25	25
	83	3	S ₅	RD ₂	08-Nov-03	1632	1453	09-31-15	53 15.8	132 49.5	53 15.6	132 50.7	484	550	534	534	25	25
	84	3	S ₅	RD ₂	09-Nov-03	0929	1568	09-31-1	53 24.8	133 03.2	53 25.4	133 02.9	802	822	797	797	25	25
	85	3	S ₅	RD ₂	09-Nov-03	1122	1595	09-31-1	53 27.3	133 10.8	53 28.0	133 10.4	502	855	665	665	24	24
Hippa Island Random Design	86	1	S ₅		09-Nov-03	1215	1635	09-31-1	53 28.7	133 06.5	53 27.4	133 05.5	535	775	598	598	61	61
	87	3	S ₅	RD ₁	10-Nov-03	2131	1322	09-31-4	53 48.5	133 18.9	53 47.8	133 19.0	186	219	204	204	24	24
	88	3	S ₅	RD ₃	11-Nov-03	0100	1340	09-31-2	53 50.3	133 43.4	53 51.0	133 43.7	1239	1234	1228	1228	25	25
Langara Island- North Frederick	89	3	S ₅	RD ₃	11-Nov-03	0805	1429	09-35-6	54 10.7	133 52.9	54 11.1	133 51.7	1038	927	980	980	25	25
	90	3	S ₅	RD ₃	11-Nov-03	0848	1481	09-35-6	54 11.5	133 53.7	54 12.2	133 53.8	1029	996	1031	1031	25	25
	91	3	S ₅	RD ₁	11-Nov-03	1033	1527	09-35-6	54 20.3	133 46.5	54 20.8	133 45.7	239	245	243	243	23	23
	92	3	S ₅	RD ₁	11-Nov-03	1212	1557	09-35-5	54 14.2	133 33.6	54 14.5	133 34.8	343	323	329	329	23	23
	93	3	S ₅	RD ₁	11-Nov-03	1300	1629	09-35-5	54 12.7	133 31.4	54 12.4	133 30.1	382	393	389	389	26	26
	94	1	S ₅		11-Nov-03	1552	1661	09-35-6	54 02.8	133 42.2	54 04.3	133 42.1	715	557	588	588	65	65

APPENDIX C EXAMPLE DATA FORMS.

SABLEFISH CHARTER SETTING BRIDGE LOG (18312)

VESSEL: Ocean Pearl SET NUMBER: 3

LOCALITY: South Van. Isl. REASON: Topping

Intended Stratum: R02 Recorder: Eric H. J.

Target Depth: Minimum: 450 (fm) Maximum: 750 (fm)

SET: Date: Oct 17 2003

1st Buoy: Number: 8 Time: 5:42 Bottom Depth: 636 (fm)

Latitude: 48 23.804 Longitude: 126 22.346

1st Anchor: Time: 5:55 Bottom Depth: 644 (fm)

Latitude: 43 23.436 Longitude: 126 22.830

SETTING BOTTOM DEPTH (fm/min): 645 638 633 635 632
631 630 626 627 629

Mean: _____ (of fm/min)

2nd Anchor: Time: 6:07 Bottom Depth: 629 (fm)

Latitude: 48 24.509 Longitude: 126 22.3

2nd Buoy: Number: 4 Time: 6:22 Bottom Depth: 613 (fm)

Latitude: 48 24.373 Longitude: 126 21.245

COMMENTS: _____

Figure C.1. Example of a completed bridge log data form used on the 2003 survey. This form was completed from the bridge as each string was set.

SABLEFISH CHARTER SET LOG

VESSEL: Sea Pearl SET NUMBER: 3
 DATE: Oct 17 2003 Recorder: WPH
 1st Buoy Number: 9 Time: 4
 1st ANCHOR TIME 0552
 NUMBER TRAPS SET: 1111111111111111
 TEMP SENSOR #: 111 On Trap #: 11
 Missed Beckets: 0
 2nd ANCHOR TIME 0604
 2nd Buoy Number: 7 Time: 11
 BAIT: Type 1: herring Weight: _____ (lb) Method: _____
 Type 2: herring Weight: _____ (lb) Method: _____
 Bait sampled? (circle one) Y / N
 COMMENTS: _____

BAIT WEIGHT QUALITY CONTROL Date Sampled: _____
 Bait Type: _____ Sampler: _____
 SOURCE: Vessel: _____ Set(s): _____
 Gross Weight/Bag 1: _____ 2: _____ 3: _____ 4: _____
 5: _____ 6: _____ 7: _____ 8: _____ 9: _____
 10: _____ 11: _____ 12: _____ 13: _____ 14: _____
 15: _____ 16: _____ 17: _____ 18: _____ 19: _____
 20: _____ 21: _____ 22: _____ 23: _____ 24: _____
 25: _____ 26: _____ 27: _____ 28: _____ 29: _____

Figure C.2. Example of a completed set log data form used on the 2003 survey. This form was completed from the deck as the gear was set.

SAMPLE 1st
SABLEFISH CHARTER CATCH LOG 8045

DATE 10/19/03 SET NUMBER: 9 pg 1

VESSEL: 2 Penn RECORDER: ME

1ST Buoy # 11 021. 1ST Anchor Aboard 0804

trap	SABLEFISH										
num	Use	#	weight	#	weight	#	weight	#	weight	#	weight
1	S	7	10.2								
2	T	11	34.9								
3	S	2	6.2								
4	T	12	11.2								
5	S	2	2.5	14	24.6						
6	T	11	20.7								
7	S	2	10.2								
8	T	11	22.7	1	1.2	1	1.2				
9	S	2	6.2								
10	T	11	21.3	13	22.5						
11	S	2	17.1								
12	T	3	7.2								
13	S	2	10.7								
14	T	11	21.7								
15	S	2	10.2								
16	T	12	11.1								
17	S	2	10.2								
18	T	11	21.3								
19	S	2	10.2								
20	T	11	21.3								
21	S	2	10.2								
22	T	11	21.3								
23	S	2	10.2								
24	T	11	21.3								
25	S	2	10.2								

2ND Buoy # 17

2ND Anchor Aboard 0811

COMMENTS: 0-8.2 T=11.1 21-22.5

The "Use" column is to indicate how the trap contents was treated: T=tagged, A=LSWMO sample, B=LF sample, D=dumped

Figure C.4. Example of a completed catch log data form used during the 2003 survey.

SABLEFISH CHARTER TAG RECOVERY SHEET

Vessel 732 Sample Type 732 Species SALE Sample Weight 465 Length Type 01 Page 1 of 12

Sampler MOAT Recorder 214 Catch Storage fresh Specimen Form 02 Maturity Convention 01

Sample Source mm Weight Type 02 Weight Unit gm

Set Number	Set Haul Date			Tag Number	Length	Sex	Mat	Weight	Wound Cond.	Otolith		Comments
	Y	M	D							Tray #	Cell #	
0000031017				ACCE	0.06			0.06	01	01	01	lost
0000031017				ACCE	0.06			0.06	01	01	01	
0000031017				ACCE	0.06			0.06	01	01	01	
0000031017				ACCE	0.06			0.06	01	01	01	
0000031017				ACCE	0.06			0.06	01	01	01	

Tag Wound Condition: blank = unknown, 00 = not examined, 01 = normal to slightly exposed (good), 02 = enlarged and raw, 04 = anchor good, suture exposed (2 tags present), 05 = anchor exposed, suture good (2 tags present), 06 = tag too tight, 07 = tag too loose, 99 = tag missing, wound only

Figure C.5. Example of a completed tag recovery form used during the 2003 survey.

columns 1-3=ST1

SABLEFISH CHARTER TAGGING SHEET

pg. 1/15

Vessel: O. Pearl

782

Set Number: 2

Date: 20031017

Sample Type: 1

1

Tagger: BB

244

Recorder: MC

128

Species: 455

455

Tag Type: 70

70

Tag Check	Primary Tag Number 35-37				Fork Length (mm)				Error 1	Error 2	Injury 1	Injury 2	Comments/ time				
	34	35	36	37	40	41	42	43	44	45	46	47	48	49	50	51	
		1	0	0													
		8	7	0	0	0		0									

Sample Type:
1 = total catch
2 = random
4 = selected
9 = juveniles
10 = adults

Tag Type:
10 = anchor
20 = suture
30 = Peterson disc

Tag Check:
null = tag number not verified
0 = tag number verified and corresponds to fish data
1 = tag number may not correspond to fish data

Error:
B = tag broken, not used
D = dead fish, tagged
P = paired tag, sequential tags in same fish
N = tag not well implanted
L = loose tag
T = tight tag
R = release of OTC from hole
U = unknown length

Injury:
A = damage from amphipods
B = bleeding
C = cuts or fresh wounds
D = fish dropped on deck
E = eyes cloudy, blind
F = fin damaged
H = misshapen fish
L = scale loss
N = scrapes and abrasion
O = bleeding at OTC hole
R = raw wound around tag
S = scar of healing wound
T = tail damaged

COMMENTS:

Figure C.6. Example of a completed tagging form used during the 2003 survey.

LSWMO
SABLEFISH CHARTER BIOSAMPLING SHEET

columns 1-3-5B1

Vessel: O. Pearl Set Number: 1752 Recorder: 11 Catch Storage: 11 Species: S. Ale Sample Date: 10/05/07 Sample Type: AST Length Type: SL Maturity Convention: SW Sample Weight: 39 page 1 of 3

Trap Num: 49 Fish Number: 50 Length: 51 Sex: 2 Mat: 59 Weight: 61 Otolith Cell Num: 63 Comments: one = 62 total

Trap Num	Fish Number	Length	Sex	Mat	Weight	Otolith Cell Num	Comments
49	50	51	2	59	61	63	one = 62 total
	1	60	4	2	23	72	
	2	59	9	1	22	46	
	3	60	2	2	22	23	
	4	54	9	1	21	62	
	5	59	0	1	22	17	
	6	59	9	2	24	0	
	7	60	2	2	22	33	
	8	60	2	2	22	22	
	9	57	5	1	22	21	
	0	59	2	1	22	21	
	1	60	7	1	4	0	
	2	60	0	2	4	0	
	3	50	4	1	1	2	
	4	53	3	2	1	4	
	5	54	8	1	4	0	
	6	62	1	2	2	0	
	7	57	7	2	2	0	
	8	59	8	2	2	1	
	9	62	1	2	2	1	
	20	54	1	2	2	1	

COMMENTS

Figure C.7. Example of a completed biological sampling form used for LS(W)MO samples during the 2003 survey.

LSM
SABLEFISH CHARTER BIOSAMPLING SHEET

column 13-281 page 1/13

Vessel: DEAN PEARL Sample Date: 12/21/03 Sample Type: Yard Sample Weight: 382

Sampler: MC Recorder: Paul Species: SAB Length Type: fork Maturity Convention: 381

Sample Source: W 501 Catch Storage: fresh Specimen Form: 1000 Weight Unit: g Maturity Convention: 381

Length Unit: mm Weight Type: 381

Trap Num	Fish Number	Length	Sex	Mat
49	50	51	52	53
54	55	56	57	58
59	60	61	62	63
64	65	66	67	68
69	70	71	72	73
74	75	76	77	78
79	80	81	82	83
84	85	86	87	88
89	90	91	92	93
94	95	96	97	98
99	100	101	102	103
104	105	106	107	108
109	110	111	112	113
114	115	116	117	118
119	120	121	122	123
124	125	126	127	128
129	130	131	132	133
134	135	136	137	138
139	140	141	142	143
144	145	146	147	148
149	150	151	152	153
154	155	156	157	158
159	160	161	162	163
164	165	166	167	168
169	170	171	172	173
174	175	176	177	178
179	180	181	182	183
184	185	186	187	188
189	190	191	192	193
194	195	196	197	198
199	200	201	202	203
204	205	206	207	208
209	210	211	212	213
214	215	216	217	218
219	220	221	222	223
224	225	226	227	228
229	230	231	232	233
234	235	236	237	238
239	240	241	242	243
244	245	246	247	248
249	250	251	252	253
254	255	256	257	258
259	260	261	262	263
264	265	266	267	268
269	270	271	272	273
274	275	276	277	278
279	280	281	282	283
284	285	286	287	288
289	290	291	292	293
294	295	296	297	298
299	300	301	302	303
304	305	306	307	308
309	310	311	312	313
314	315	316	317	318
319	320	321	322	323
324	325	326	327	328
329	330	331	332	333
334	335	336	337	338
339	340	341	342	343
344	345	346	347	348
349	350	351	352	353
354	355	356	357	358
359	360	361	362	363
364	365	366	367	368
369	370	371	372	373
374	375	376	377	378
379	380	381	382	383
384	385	386	387	388
389	390	391	392	393
394	395	396	397	398
399	400	401	402	403
404	405	406	407	408
409	410	411	412	413
414	415	416	417	418
419	420	421	422	423
424	425	426	427	428
429	430	431	432	433
434	435	436	437	438
439	440	441	442	443
444	445	446	447	448
449	450	451	452	453
454	455	456	457	458
459	460	461	462	463
464	465	466	467	468
469	470	471	472	473
474	475	476	477	478
479	480	481	482	483
484	485	486	487	488
489	490	491	492	493
494	495	496	497	498
499	500	501	502	503
504	505	506	507	508
509	510	511	512	513
514	515	516	517	518
519	520	521	522	523
524	525	526	527	528
529	530	531	532	533
534	535	536	537	538
539	540	541	542	543
544	545	546	547	548
549	550	551	552	553
554	555	556	557	558
559	560	561	562	563
564	565	566	567	568
569	570	571	572	573
574	575	576	577	578
579	580	581	582	583
584	585	586	587	588
589	590	591	592	593
594	595	596	597	598
599	600	601	602	603
604	605	606	607	608
609	610	611	612	613
614	615	616	617	618
619	620	621	622	623
624	625	626	627	628
629	630	631	632	633
634	635	636	637	638
639	640	641	642	643
644	645	646	647	648
649	650	651	652	653
654	655	656	657	658
659	660	661	662	663
664	665	666	667	668
669	670	671	672	673
674	675	676	677	678
679	680	681	682	683
684	685	686	687	688
689	690	691	692	693
694	695	696	697	698
699	700	701	702	703
704	705	706	707	708
709	710	711	712	713
714	715	716	717	718
719	720	721	722	723
724	725	726	727	728
729	730	731	732	733
734	735	736	737	738
739	740	741	742	743
744	745	746	747	748
749	750	751	752	753
754	755	756	757	758
759	760	761	762	763
764	765	766	767	768
769	770	771	772	773
774	775	776	777	778
779	780	781	782	783
784	785	786	787	788
789	790	791	792	793
794	795	796	797	798
799	800	801	802	803
804	805	806	807	808
809	810	811	812	813
814	815	816	817	818
819	820	821	822	823
824	825	826	827	828
829	830	831	832	833
834	835	836	837	838
839	840	841	842	843
844	845	846	847	848
849	850	851	852	853
854	855	856	857	858
859	860	861	862	863
864	865	866	867	868
869	870	871	872	873
874	875	876	877	878
879	880	881	882	883
884	885	886	887	888
889	890	891	892	893
894	895	896	897	898
899	900	901	902	903
904	905	906	907	908
909	910	911	912	913
914	915	916	917	918
919	920	921	922	923
924	925	926	927	928
929	930	931	932	933
934	935	936	937	938
939	940	941	942	943
944	945	946	947	948
949	950	951	952	953
954	955	956	957	958
959	960	961	962	963
964	965	966	967	968
969	970	971	972	973
974	975	976	977	978
979	980	981	982	983
984	985	986	987	988
989	990	991	992	993
994	995	996	997	998
999	1000	1001	1002	1003

COMMENTS: N=35

Figure C.8. Example of a completed biological sampling form used for LSM samples during the 2003 survey.

APPENDIX D SABLEFISH GONAD MATURITY STAGES

Maturity Stage	Code	Males	Females
Immature 1	01	very thin string-like >1 mm thick, translucent white colour	thin string-like =1.5mm thick mid-section, translucent-white colour
Immature 2	02	thin string-like 3mm thick, extends length of cavity, white-translucent colour	thickened >5mm, does not extend length of cavity, some folds sausage like translucent-white colour
Ripening 1	03	thick >10mm visible folds, white smooth texture, =20% body cavity	eggs present, white opaque colour encased in translucent sock, <25% of body cavity
Ripening 2	04	as above but with blood vessels present on surface, >30% body cavity	eggs larger =1mm diameter, white in colour, blood vessels present on surface, >25% of body cavity
Ripe	05	as above blood vessels present, folds delicate, some sperm may flow, >40% of body cavity	eggs at least 1mm diameter, white in colour, gonad full size, >50% of body cavity
Ripe 1	06	no stage in males	gonad same size as above but at least 25% of eggs have become translucent
Ripe 2	07	no stage in males	gonad same size as above but at least 50% of eggs have become translucent
Running Ripe	08	lobes fully developed, sperm is released when slight pressure is applied to external posterior region of body cavity	stream of translucent eggs released when slight-moderate pressure is applied to external posterior region of body cavity
Spent	09	lobes or folds are bloodshot, some sperm may be present when moderate pressure is applied to external posterior region of body cavity	gonad is red-purple in colour, residual eggs may be present, outer wall of gonad flaccid
Resorbing	10	no stage in males	eggs present but did not function normally (not normal)
Recovering	11	lobes flat, brown in colour, bloodshot appearance on edges and ends of lobes	still some red purple colour, not flaccid, whitish sheen to exterior surface
Resting	12	firm, light brown colour, some wrinkles on surface	smooth elongated and round in shape, brown purple pulp interior, exterior surface has whitish sheen

APPENDIX E ROCKFISH GONAD MATURITY STAGES

Maturity Code	Maturity Stage	Gonad Condition
0	unknown	
1	immature	translucent pink, males threadlike, females small
Females		
2	maturing	small, yellow eggs, translucent or opaque
3	mature	large, yellow or orange eggs, opaque
4	fertilized	large, orange-yellow eggs, translucent
5	embryos or larvae	include eyed eggs, translucent
6	spent	large, flaccid, red ovaries, a few larvae may be present
7	resting	moderate size, firm, orange-grey ovaries, some with dark blotches
Males		
2	maturing	stringlike, slight swelling, translucent
3	developing	swelling, brown-white
4	developed	large, white, easily broken
5	running	running sperm
6	spent	white-brown, sperm still in duct
7	resting	triangular in cross-section, small, brown

APPENDIX F SUMMARY OF TRAP USE DURING THE 2003 STANDARDIZED PROGRAM CHARTER

The fate of the sablefish catch for each trap within each set is indicated as follows: D = sablefish discarded after weighing (large fish retained by vessel as commercial catch, A = sample A (LSM(W)O, B = sample B (LSM), S = sample but not specified if either A or B, T = tagged, - = no sablefish catch, blank = trap missing or not fishing.

Set																											
Trap	I	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25		
1	A	B	B	B	-	-	A	-	A	A	B	B	A	A	A	T	T	T	T	T	T	T	T	T	T	T	
2	A	A	A	A	A	A	A	-	-	B	B	A	A	A	-	A	T	T	T	T	T	T	T	T	T	T	
3	B	B	B	-	-	-	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
4	A	A	A	A	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
5	B	A	B	A	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
6	B	A	A	A	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
7	A	A	A	A	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
8	B	-	A	B	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
9	B	A	A	A	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
10	B	A	A	A	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
11	B	B	B	B	-	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
12	B	A	B	-	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
13	B	A	B	A	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
14	B	D	B	A	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
15	B	-	B	B	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
16	B	B	A	A	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
17	B	-	A	A	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
18	A	A	B	A	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
19	B	-	A	A	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
20	B	A	A	A	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
21	B	A	B	-	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
22	B	A	B	A	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
23	B	A	B	A	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
24	B	A	A	A	A	A	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
25	B	B	B	B	A	B	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
26	B	B	B	B	A	B	-	A	-	B	B	A	A	B	A	T	T	T	T	T	T	T	T	T	T	T	
27																											

Totals																											
A	5	16	8	15	22	12	4	12	11	7	6	13	16	14	9	4	7	7	6	5	8	3	4	7	4		
B	20	4	15	6	0	3	0	0	6	18	11	0	6	0	0	0	0	0	0	0	0	0	0	0	0		
T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	16	10	14	9	13	21	19	14	21		
D	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-	0	4	0	4	3	5	22	13	8	0	1	2	9	5	16	0	2	8	5	11	4	1	0	4	0		
Traps	25	25	23	25	25	20	26	25	25	25	25	26	25	25	25	24	25	25	25	25	25	25	23	25	25		

Trap	Set																										
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50		
1	T	A	T	D	D	D	A	T	D	D	-	B	B	A	A	-	-	D	-	D	D	A	A	-	-	A	
2	A	T	D	A	T	A	T	-	D	D	A	D	A	B	B	-	-	A	A	-	B	-	A	A	-	A	
3	D	D	A	T	A	A	D	A	-	D	-	D	B	A	A	-	-	B	-	-	D	A	A	-	-	A	
4	T	T	D	D	D	D	D	D	T	T	A	D	A	B	B	A	A	D	A	D	A	-	-	-	-	A	
5	D	D	T	D	D	-	A	T	A	D	D	B	D	B	B	-	-	D	A	B	B	A	A	-	-	-	
6	T	D	T	D	T	T	-	D	D	D	-	-	B	D	B	-	-	A	D	-	B	D	A	-	-	-	
7	D	T	T	D	D	-	A	T	T	T	-	D	D	D	A	-	A	D	-	D	D	A	-	-	-	-	
8	T	T	D	D	D	-	-	T	D	A	-	-	B	A	-	-	-	D	A	-	A	B	A	-	-	-	
9	D	T	D	T	D	D	-	T	D	D	-	-	A	B	B	-	-	D	-	A	B	D	A	-	-	-	
10	T	T	D	D	D	A	T	D	D	D	-	B	A	B	A	-	-	D	A	B	D	A	-	-	-	-	
11	D	D	D	D	D	D	D	T	D	D	-	A	D	B	A	-	-	D	-	D	D	-	-	-	-	-	
12	T	T	D	T	D	T	T	A	D	D	-	A	B	A	B	-	-	B	A	B	B	-	-	-	-	-	
13	D	D	T	D	D	-	-	D	D	A	-	A	D	D	-	-	-	D	A	B	D	-	-	-	-	-	
14	D	T	D	D	T	-	T	D	D	D	-	A	D	D	A	-	-	D	A	D	D	A	-	-	-	-	
15	T	D	-	T	A	-	-	T	D	T	-	B	B	-	B	-	-	D	A	B	B	A	-	-	-	-	
16	D	T	T	D	D	-	-	D	D	D	-	B	D	B	-	-	-	D	-	D	D	-	-	-	-	-	
17	D	D	D	D	D	A	D	D	T	D	A	A	B	D	-	-	-	D	-	B	D	-	-	-	-	-	
18	D	T	D	D	T	-	-	D	D	D	-	B	D	D	-	-	-	B	-	A	B	A	A	-	-	-	
19	T	-	D	D	-	-	T	D	D	T	-	A	D	B	-	-	-	D	-	D	D	A	-	-	-	-	
20	D	A	T	T	D	T	D	D	D	D	-	-	A	D	-	-	-	D	-	D	A	A	-	-	-	-	
21	D	-	D	T	A	T	A	D	A	A	-	A	B	A	A	A	-	B	-	B	A	A	A	A	A	A	
22	T	T	D	D	D	-	D	D	D	D	-	-	D	D	A	A	-	D	-	D	B	A	A	A	-	-	
23	D	A	T	T	A	-	D	D	D	D	-	A	D	D	-	-	-	A	-	D	A	A	A	A	-	-	
24	A	-	D	T	A	-	D	D	D	D	-	B	B	A	A	A	-	A	-	D	A	B	A	A	-	-	
25	D	A	-	D	-	T	D	D	D	D	-	-	B	A	A	-	-	B	A	B	B	B	A	A	-	-	
26	D	-	-	D	D	-	D	D	D	D	-	-	B	B	B	-	-	-	A	D	D	-	-	-	-	-	
27	D	-	-	-	-	-	D	D	D	D	-	-	-	-	-	-	-	-	A	D	-	-	-	-	-	-	
Totals																											
A	2	4	1	1	4	3	4	2	2	3	3	10	3	6	9	8	4	2	12	3	2	14	13	11	8		
B	0	0	0	0	0	0	0	0	0	0	0	8	10	9	7	0	0	8	0	10	6	3	0	0	0	0	
T	9	10	8	8	4	7	7	6	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
D	14	8	14	16	15	4	12	16	19	18	0	4	11	9	0	0	0	14	0	12	12	0	0	0	0	0	
-	0	3	1	0	2	11	4	1	1	0	20	3	0	1	9	17	21	0	13	1	0	8	12	14	17		
Traps	25	25	24	25	25	25	27	25	25	25	23	25	24	25	25	25	25	24	25	26	20	25	25	25	25	25	

Trap	Set																										
	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75		
1	-	-	B	B	B	-	-	-	-	A	B	B	B	-	B	B	B	-	-	-	A	-	B	B	B	B	
2	A	A	A	D	D	-	A	A	-	-	D	A	D	A	D	A	A	-	-	A	A	-	A	D	D	D	
3	A	A	D	D	D	-	A	A	-	A	D	D	A	-	D	B	D	-	A	-	-	-	-	A	A	D	
4	A	-	D	D	D	A	-	-	-	-	B	D	B	-	A	D	D	A	A	A	A	-	A	B	A	A	
5	A	-	D	A	A	-	-	A	A	-	D	B	D	A	D	B	-	-	A	-	A	-	-	B	D	B	
6	-	A	B	B	B	-	A	-	-	-	D	A	-	A	D	D	-	-	A	-	-	-	-	D	D	D	
7	A	-	D	D	D	-	-	A	-	-	A	D	A	-	B	B	B	-	A	-	-	-	D	B	D	D	
8	-	A	D	D	D	-	-	-	A	-	D	D	B	A	D	A	A	A	A	-	A	-	A	-	A	-	
9	-	A	D	D	D	A	-	A	A	-	D	B	A	-	D	B	B	A	A	-	-	-	B	D	B	B	
10	-	-	B	A	D	-	A	-	A	-	B	D	A	-	A	D	A	-	-	-	A	-	-	D	D	D	
11	-	-	D	B	B	-	-	-	A	-	D	-	A	-	D	B	B	A	-	-	-	-	-	A	D	D	
12	-	A	-	D	D	-	-	-	A	-	D	D	B	-	B	A	A	-	-	-	-	-	-	-	B	B	
13	-	A	A	B	A	-	-	-	A	-	D	D	B	A	D	B	-	-	-	-	-	-	-	-	D	D	
14	A	A	D	D	D	A	-	-	-	-	D	D	B	A	D	D	B	-	-	-	-	-	-	-	D	D	
15	A	A	B	A	B	-	-	-	-	-	B	D	B	-	A	D	-	-	-	-	-	-	-	-	D	D	
16	-	-	D	B	D	-	A	-	A	-	D	B	-	-	B	A	B	A	-	-	-	-	-	-	D	D	
17	-	A	D	D	D	-	-	-	A	-	D	D	B	A	D	B	-	-	-	-	-	-	-	-	D	D	
18	-	A	-	D	B	-	-	-	-	-	D	D	B	-	D	D	A	-	A	-	-	-	-	-	D	D	
19	-	-	A	B	D	A	-	A	A	A	D	B	A	-	B	D	B	-	-	-	-	-	-	-	-	D	
20	-	-	A	B	D	A	-	-	A	-	-	D	B	-	A	A	B	A	-	-	-	-	-	-	-	D	
21	-	-	A	A	D	B	-	-	A	-	B	D	B	-	D	B	-	-	-	-	-	-	-	-	-	-	
22	-	-	D	A	D	-	-	-	A	-	D	A	B	-	D	B	A	-	-	-	-	-	-	-	-	-	
23	A	A	B	B	D	-	A	A	A	-	A	D	A	-	D	D	-	A	A	-	-	-	-	-	-	-	
24	A	-	D	D	B	-	-	-	-	-	A	D	A	-	B	D	A	-	-	-	-	-	-	-	-	-	
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Totals	9	14	4	4	3	4	7	7	15	5	2	4	9	7	4	5	8	8	10	4	17	5	8	4	3		
A	0	0	6	7	7	0	0	0	0	0	6	5	11	0	7	10	8	0	0	0	0	0	12	4	7		
B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
T	0	0	12	14	14	0	0	0	0	0	16	13	2	0	14	9	2	0	0	0	0	0	3	16	14		
D	15	11	2	0	0	19	17	18	10	20	1	1	3	18	0	1	6	17	14	22	7	21	2	1	0		
Traps	24	25	24	25	24	23	24	25	25	25	25	23	25	25	25	25	24	25	24	26	24	26	25	25	24		

Trap	Set											
	76	77	78	79	80	81	82	83	84			
1	B	B	A	-	B	B	A	A	D			
2	A	A	-	-	D	B	-	A	D			
3	B	A	A	A	D	D	-	-	D			
4	A	B	A	-	A	A	B	-	D			
5	B	B	A	-	B	-	-	A	B			
6	A	A	-	A	D	B	A	-	D			
7	B	-	-	-	D	B	-	A	D			
8	D	B	A	A	B	D	-	-	D			
9	D	B	-	A	A	A	-	A	A			
10	B	A	-	-	D	B	A	A	D			
11	A	B	-	A	D	B	A	A	D			
12	D	-	-	A	B	D	A	-	B			
13	D	B	-	-	A	A	-	-	D			
14	B	D	-	-	D	B	-	-	D			
15	D	B	-	-	D	B	B	-	D			
16	D	A	A	-	B	D	-	-	D			
17	B	B	-	-	A	-	A	-	D			
18	D	B	-	-	D	D	B	-	B			
19	D	A	A	-	D	A	A	-	D			
20	A	A	-	-	B	D	B	A	A			
21	D	A	-	-	A	B	A	-	D			
22	-	B	-	-	D	D	-	-	D			
23	B	B	-	-	D	D	A	-	D			
24	A	A	-	A	D	D	A	A	D			
25	D	B	-	-	D	-	B	-	D			
26												
27												
Totals												
A	6	9	7	7	5	4	10	9	2			
B	8	13	0	0	6	9	5	0	3			
T	0	0	0	0	0	0	0	0	0			
D	10	1	0	0	14	9	0	0	20			
-	1	2	18	18	0	2	10	16	0			
Traps	25	25	25	25	25	24	25	25	25			

**APPENDIX G SUMMARY OF TRAP USE DURING THE 2003 TAGGING
PROGRAM CHARTER**

The fate of the sablefish catch for each trap within each Type 3 set is indicated as follows: D = sablefish discarded after weighing (large fish retained by vessel as commercial catch, A = sample A (LSM(W)O, B = sample B (LSM), S = sample but not specified if either A or B, T = tagged, - = no sablefish catch, blank = trap missing or not fishing. Type 1 sets are not shown as all traps were tagged until the tagging goal was reached at which point the remainder of the catch was dumped.

		Set																									
Trap	3	4	5	6	7	8	9	11	12	13	14	15	16	17	18	20	21	22	23	24	26	27	28	29	30		
1	T	-	A	T	T	S	S	A	-	-	-	-	S	T	T	-	T	A	A	A	T	A	A	S			
2	-	T	T	S	-	T	T	T	-	-	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
3	-	A	B	T	T	S	T	T	-	-	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
4	T	T	T	T	-	S	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
5	T	T	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
6	A	T	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
7	T	T	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
8	-	T	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
9	T	T	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
10	A	T	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
11	T	T	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
12	A	T	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
13	T	T	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
14	A	-	-	T	T	S	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
15	-	-	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
16	-	-	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
17	T	T	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
18	T	T	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
19	-	T	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
20	-	T	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
21	-	T	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
22	A	T	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
23	T	T	T	T	S	T	T	T	-	A	-	-	S	T	T	S	A	-	T	T	S	T	-	T			
24	A	-	A	T	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
25	A	-	A	T	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
26																											
Totals																											
A	6	9	5	0	0	0	0	10	0	9	4	9	0	0	4	0	7	0	6	3	0	4	6	0	4		
B	0	0	8	0	0	0	0	0	0	0	0	0	0	0	7	0	6	0	5	10	0	7	4	0	7		
S	0	0	0	11	9	12	11	0	10	0	0	0	12	12	0	11	0	11	0	0	12	0	0	13	0		
T	12	9	12	11	9	12	12	12	9	8	1	11	12	12	12	12	13	12	11	13	13	11	8	12	13		
D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-	6	7	0	0	7	1	2	2	7	8	21	5	0	0	2	1	0	2	2	0	0	1	7	0	0		
Traps	24	25	25	22	25	25	25	24	26	25	26	25	24	24	25	24	26	25	24	26	25	23	25	25	24		

		Set																									
Trap	31	33	34	37	38	39	40	43	44	46	47	48	49	50	51	52	53	55	56	57	58	59	60	61	62		
1	A	-	A	T	S	T	T	A	A	-	T	A	T	B	A	T	A	-	-	A	-	A	T	T	A		
2	T	A	T	A	T	A	B	T	T	A	A	T	A	T	T	A	T	T	-	-	-	-	A	-	-		
3	A	T	B	T	S	-	T	A	B	T	T	A	T	A	B	T	B	A	T	A	-	-	T	T	-		
4	T	B	T	-	T	A	T	T	T	-	A	T	T	T	T	T	T	T	-	-	-	-	A	A	-		
5	B	T	B	T	S	T	T	B	T	A	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
6	T	B	T	T	T	-	T	T	T	-	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
7	A	-	A	T	S	B	T	A	T	-	B	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
8	-	T	B	T	T	A	T	T	T	-	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
9	B	T	B	T	S	T	T	B	T	-	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
10	T	B	T	A	T	T	A	T	T	-	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
11	A	-	T	T	S	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
12	T	-	T	T	T	-	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
13	B	T	T	-	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
14	T	A	T	A	T	T	-	T	T	A	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
15	B	T	T	-	S	T	T	T	T	-	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
16	T	B	T	-	T	T	A	T	T	A	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
17	B	T	B	-	S	T	T	T	T	-	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
18	T	-	T	-	T	-	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
19	B	T	T	T	S	T	T	T	T	-	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
20	T	B	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
21	B	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
22	T	B	T	-	T	T	T	T	T	-	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
23	B	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
24	T	-	T	T	T	T	T	T	T	A	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
25	B	T	A	T	T	T	T	T	T	-	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-		
26																											
Totals		4	3	2	4	0	8	6	3	3	7	4	4	5	3	5	2	12	10	8	5	4	4	6	7		
A		9	6	11	2	0	2	5	10	9	0	9	8	8	10	7	5	0	0	4	0	0	8	0	0		
B		0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
S		11	12	11	9	12	11	13	11	12	5	13	12	12	12	13	13	11	10	10	6	5	13	6	3		
T		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0		
D		1	4	1	10	0	4	1	1	0	12	0	0	0	0	0	0	2	5	3	15	16	0	10	15		
Traps	25	25	25	25	24	25	25	25	25	24	24	25	25	25	25	25	26	25	25	25	26	25	25	22	25		

Set																											
Trap	63	64	66	67	69	70	71	73	74	75	76	77	78	80	82	83	84	85	87	88	89	90	91	92	93		
1	A	A	T	-	T	T	T	A	A	-	-	A	A	T	A	T	-	-	-	-	-	T	A	T	A	A	
2	T	T	B	-	A	A	A	-	T	-	-	T	T	A	T	B	A	T	-	-	-	A	A	T	A	T	
3	A	T	B	-	-	T	T	A	A	T	T	A	-	T	B	T	T	A	-	-	-	-	-	T	A	T	
4	T	T	B	-	-	T	T	-	T	T	A	T	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
5	A	T	B	-	-	T	T	-	T	T	A	T	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
6	T	B	T	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
7	B	T	A	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
8	T	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
9	B	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
10	T	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
11	B	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
12	T	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
13	B	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
14	T	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
15	B	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
16	T	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
17	B	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
18	T	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
19	D	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
20	T	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
21	D	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
22	T	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
23	D	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
24	T	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
25	D	T	B	-	-	T	T	-	-	-	-	-	-	-	T	A	T	A	-	-	-	-	-	-	-	-	
26																											
Totals		3	2	2	6	6	4	3	4	6	6	5	3	6	7	3	2	2	6	0	2	8	8	4	3	3	
A	6	10	5	0	0	8	8	0	5	0	0	7	0	3	5	6	5	5	0	0	0	0	0	8	6	6	
B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
S	12	12	13	5	7	12	12	0	8	7	3	12	10	9	12	13	12	12	1	2	7	7	6	11	14	14	
T	4	0	5	0	0	0	0	0	0	0	0	3	0	0	5	4	5	0	0	0	0	0	0	0	3	3	
D	0	1	0	14	11	0	2	21	6	10	17	0	10	6	0	0	1	2	23	21	10	10	13	2	0	0	
Traps	25	25	25	25	24	24	25	25	25	23	25	25	26	25	25	25	25	25	24	24	25	25	23	24	26	26	

APPENDIX H DETAILS ON SABLEFISH CATCH AND NUMBERS RECOVERED, SAMPLED AND TAGGED DURING THE 2003 STANDARDIZED PROGRAM CHARTER (VIKING STAR).

Set	Catch		Number		Fork length	Number sampled for			Round Weight	Proportion males	Mean fork length (mm)	
	Weight (kg)	Count	Recovered	Tagged		Sex	Maturity	Otoliths			Males	Females
1	2262	819	1	0	0	817	816	47	46	47	0.29	605
2	242	89	0	0	0	87	86	60	61	59	0.47	600
3	622	249	0	0	0	248	248	63	63	63	0.47	582
4	139	73	0	0	0	73	73	53	52	52	0.63	546
5	122	55	0	0	0	56	55	55	56	54	0.36	543
6	176	85	2	0	0	83	83	59	59	59	0.52	559
7	31	8	0	0	0	8	8	8	8	8	0.00	703
8	91	28	2	0	0	26	26	26	26	26	0.15	629
9	915	301	0	0	0	306	306	306	91	50	0.25	612
10	649	244	1	0	0	242	242	242	43	16	0.66	603
11	1346	479	2	0	0	476	476	476	68	24	0.27	610
12	348	130	3	0	0	127	127	127	48	48	0.46	583
13	110	45	0	0	0	45	45	45	45	25	0.44	563
14	307	122	0	0	0	120	120	120	50	51	0.28	582
15	126	41	1	0	0	40	40	40	40	40	0.20	575
16	1030	490	8	404	0	63	63	63	63	0	0.16	555
17	415	217	3	148	0	64	64	64	64	0	0.45	535
18	313	156	0	112	0	37	37	37	37	37	0.24	526
19	724	452	2	391	0	53	54	54	54	12	0.22	522
20	486	319	6	272	0	33	34	34	34	21	0.44	501
21	785	292	6	236	0	45	45	45	45	0	0.40	569
22	826	385	10	304	0	53	53	53	53	0	0.40	566
23	1191	500	11	435	0	46	46	46	46	20	0.33	540
24	780	387	2	316	0	59	59	59	55	20	0.36	562
25	1106	418	10	352	0	51	51	51	51	19	0.24	577
26	1504	688	3	245	0	78	78	78	78	78	0.60	563
27	942	397	7	157	0	40	40	40	40	40	0.30	588
28	1611	678	7	271	0	54	54	54	54	54	0.39	568
29	1604	743	7	221	0	54	54	54	54	54	0.30	528
30	1295	557	0	122	0	49	49	49	49	49	0.39	564
31	397	227	0	83	0	56	56	56	56	56	0.43	538

574
552
563
533
528
621
570
597
574
616
584
600
594
575
595
554

Set	Catch			Number			Number sampled for			Proportion		Mean fork length (mm)	
	Weight (kg)	Count	Recovered	Tagged	Fork length	Sex	Maturity	Otoliths	Round Weight	males		Males	Females
32	1030	554	0	70	52	52	52	52	52	0.40		536	564
33	1496	772	0	89	74	74	74	74	74	0.30		548	575
34	2241	961	1	110	78	78	78	78	78	0.37		570	599
35	2192	771	6	69	95	95	95	93	95	0.22		584	629
36	23	5	0	0	5	5	5	5	0	0.00		750	750
37	668	212	0	0	142	142	142	64	64	0.26		615	666
38	1405	455	0	0	179	179	179	51	51	0.46		619	668
39	1262	431	1	0	208	208	208	65	65	0.51		609	671
40	342	96	0	0	95	95	95	48	48	0.33		636	703
41	45	14	0	0	14	14	14	14	0	0.29		650	678
42	24	5	0	0	5	5	5	5	5	0.00		763	763
43	1344	430	3	0	164	164	164	50	50	0.34		611	670
44	128	36	0	0	36	36	36	33	36	0.25		645	687
45	1391	451	3	0	212	212	212	56	56	0.34		619	670
46	1168	457	1	0	158	158	158	53	53	0.44		598	629
47	254	92	5	0	86	87	87	66	66	0.44		591	656
48	101	54	0	0	54	54	54	54	54	0.83		542	650
49	72	22	0	0	22	22	22	22	22	0.27		635	678
50	47	15	0	0	15	15	15	14	14	0.53		641	697
51	42	13	0	0	13	13	13	13	13	0.69		674	703
52	87	29	0	0	29	29	29	29	0	0.45		616	692
53	996	366	2	0	193	193	193	47	47	0.53		595	671
54	1599	549	2	0	168	168	168	48	48	0.54		609	664
55	1455	465	1	0	178	179	179	46	46	0.36		622	667
56	11	4	0	0	4	4	4	4	4	0.25		500	666
57	51	13	0	0	13	13	13	13	13	0.08		770	707
58	66	17	0	0	17	17	17	17	8	0.53		706	738
59	177	48	0	0	48	48	48	48	3	0.42		678	702
60	42	15	0	0	16	16	16	16	16	0.06		638	625
61	1795	564	1	0	193	193	193	47	47	0.19		612	666
62	1237	444	1	0	115	115	115	42	42	0.37		607	643
63	476	179	3	0	153	153	153	42	42	0.48		602	631
64	42	9	0	0	9	9	9	9	9	0.00		730	730
65	1448	507	2	0	212	212	212	64	64	0.29		614	642
66	1016	367	0	0	183	183	183	47	47	0.35		616	628

Set	Catch		Number		Fork length	Number sampled for			Proportion males	Mean fork length (mm)	
	Weight (kg)	Count	Recovered	Tagged		Sex	Maturity	Otoliths		Males	Females
67	594	215	3	0	0	170	170	54	25	602	646
68	88	32	0	0	0	32	32	32	21	602	647
69	64	18	0	0	0	18	18	18	11	621	703
70	24	6	0	0	0	6	6	6	6	714	717
71	117	45	0	0	0	45	45	45	45	603	672
72	62	14	0	0	0	0	14	14	0	0.07	
73	480	242	0	0	0	177	177	58	58	554	630
74	1235	660	3	0	0	187	187	52	17	558	617
75	867	337	0	0	0	165	165	55	54	585	631
76	700	292	1	0	0	183	183	49	0	589	613
77	492	175	0	0	0	156	156	46	2	600	640
78	102	28	0	0	0	28	28	28	28	653	720
79	121	42	0	0	0	42	42	42	42	618	657
80	878	332	0	0	0	154	154	49	0	599	645
81	913	356	1	0	0	177	177	49	49	570	636
82	266	97	0	0	0	97	97	56	40	582	692
83	64	19	0	0	0	19	19	18	19	609	675
84	2563	945	0	0	0	149	149	61	61	580	626

APPENDIX I DETAILS ON SABLEFISH CATCH AND NUMBERS RECOVERED, SAMPLED AND TAGGED DURING THE 2003 TAGGING PROGRAM CHARTER (OCEAN PEARL).

Set	Catch		Number		Number sampled for				Proportion		Mean fork length (mm)		
	Weight (kg)	Count	Recovered	Tagged	Fork length	Sex	Maturity	Otoliths	Round Weight	males	Males	Females	Tagged
1	991	327	0	326	0	0	0	0	0				628
2	1717	577	7	574	0	0	0	0	0				623
3	177	61	1	41	19	19	18	19	18		559	609	636
4	314	161	3	80	78	78	78	78	0	0.21	542	578	559
5	1345	464	0	226	235	235	235	60	0	0.72	593	645	622
6	1263	505	0	243	257	257	254	42	0	0.39	589	627	608
7	183	100	0	32	68	68	67	49	0	0.50	545	569	535
8	811	342	0	211	122	122	121	48	0	0.57	573	607	598
9	488	223	0	140	81	81	81	51	0	0.19	537	596	580
10	1666	415	4	399	0	0	0	0	0	0.31			685
11	96	56	0	19	30	30	30	30	30	0.70	538	632	542
12	218	98	0	37	58	58	58	44	44	0.50	555	602	585
13	92	41	0	22	14	14	14	14	14	0.57	557	634	582
14	25	6	0	1	5	5	5	5	5	0.00		747	647
15	148	76	0	42	33	33	33	33	33	0.64	541	616	551
16	805	383	0	161	216	216	216	44	44	0.54	561	608	576
17	1124	475	2	218	245	245	245	55	55	0.65	575	610	589
18	663	314	14	163	136	136	136	50	48	0.68	555	581	564
19	2502	1032	7	1006	0	0	0	0	0				593
20	293	115	0	58	57	57	57	50	48	0.46	586	638	603
21	573	249	6	133	111	111	111	51	51	0.54	555	623	584
22	525	233	1	121	109	109	109	51	51	0.70	563	642	581
23	1473	323	0	226	96	96	96	51	51	0.05	606	723	708
24	2303	982	3	538	421	421	421	52	52	0.81	582	612	590
25	954	323	2	321	0	0	0	0	0				621
26	1090	427	1	247	178	177	177	50	50	0.73	594	632	591
27	755	268	0	124	147	147	147	50	0	0.49	590	643	602
28	529	199	0	74	112	112	112	52	0	0.59	600	633	615
29	1417	481	1	247	233	233	233	50	50	0.50	606	639	629
30	1031	580	0	289	290	290	290	59	57	0.84	542	588	548
31	835	422	0	230	188	188	187	55	54	0.74	540	626	560

Set	Catch		Number		Fork length	Number sampled for				Round Weight	Proportion males	Mean fork length (mm)		
	Weight (kg)	Count	Recovered	Tagged		Sex	Maturity	Otoliths	Males			Females	Tagged	
32	766	311	3	302	0	0	0	0	0	0				607
33	737	242	1	141	102	102	102	49	49	49	0.22	586	654	631
34	1433	539	1	197	342	342	342	44	44	44	0.23	566	627	620
35	2931	1019	4	1016	0	0	0	0	0	0				628
36		1105	0	0	0	0	0	0	0	0	0.00	0	0	0
37	272	105	0	27	80	80	80	52	52	52	0.39	580	616	618
38	1914	774	0	367	397	397	397	59	59	59	0.55	597	615	603
39	472	155	0	73	84	84	84	51	51	0	0.35	587	649	627
40	452	198	3	92	99	99	99	49	49	0	0.65	595	633	602
41	760	309	3	301	0	0	0	0	0	0				598
42		1415	0	0	0	0	0	0	0	0	0.00	0	0	0
43	1216	483	0	245	233	233	233	50	50	0	0.63	592	636	610
44	1064	471	0	257	141	141	141	40	40	0	0.34	558	600	574
45	1879	972	60	935	0	0	0	0	0	0				560
46	93	45	0	21	18	18	18	18	18	18	0.33	500	535	557
47	1482	514	1	298	198	198	198	49	49	49	0.27	585	629	626
48	786	357	0	158	201	201	201	57	57	57	0.84	564	621	587
49	1177	408	0	226	177	177	177	53	53	51	0.68	602	639	619
50	1031	423	0	247	176	176	176	61	61	61	0.58	584	618	596
51	1022	462	0	224	237	237	237	54	54	53	0.76	572	639	569
52	1212	481	0	277	210	210	210	56	56	54	0.60	587	604	587
53	1673	618	1	281	178	178	177	43	43	43	0.48	607	637	612
54	879	303	7	306	0	0	0	0	0	0				638
55	370	101	2	58	44	44	44	44	44	44	0.52	628	690	678
56	558	145	1	95	55	55	55	55	55	55	0.55	654	764	672
57	609	154	0	83	78	78	78	59	59	59	0.69	680	728	680
58	48	17	0	11	6	6	6	6	6	6	0.17	462	566	634
59	103	24	0	14	9	9	9	9	9	9	0.44	684	724	693
60	1296	433	0	251	183	183	183	54	54	53	0.55	610	640	626
61	185	37	0	13	25	25	25	25	25	25	0.32	716	762	757
62	50	14	0	5	9	9	9	9	9	9	0.33	700	671	690
63	1727	574	2	287	209	209	209	45	45	45	0.44	615	640	621
64	1368	460	2	221	197	197	197	53	53	53	0.36	635	636	610
65	1137	297	0	305	0	0	0	0	0	0				687
66	1822	573	0	313	199	199	199	63	63	63	0.44	614	652	626

Set	Catch		Number		Fork length	Number sampled for				Proportion males	Mean fork length (mm)		
	Weight (kg)	Count	Recovered	Tagged		Sex	Maturity	Otoliths	Round Weight		Males	Females	Tagged
67	452	126	2	67	64	64	64	64	64	0.16	640	668	679
68	3218	1097	13	1068	0	0	0	0	0				621
69	316	81	0	27	57	57	57	57	57	0.18	634	689	662
70	1269	517	3	300	200	200	200	54	54	0.43	582	605	592
71	960	397	1	196	197	197	197	47	47	0.20	588	604	584
72	957	311	0	334	0	0	0	0	0				619
73	76	18	0	0	18	18	18	18	18	0.33	661	733	
74	593	230	2	117	116	116	116	46	46	0.59	559	676	608
75	239	88	0	62	28	28	28	28	28	0.50	592	686	637
76	85	29	0	11	18	18	18	18	18	0.83	660	674	645
77	1257	594	2	328	199	198	197	51	51	0.76	555	648	573
78	291	78	2	46	28	28	28	28	28	0.29	644	709	671
79	775	307	21	280	0	0	0	0	0				595
80	546	194	0	39	154	153	148	44	44	0.48	613	681	633
81	1763	718	6	721	0	0	0	0	0				608
82	1704	705	3	359	201	201	201	50	50	0.59	596	626	598
83	1511	594	3	312	189	189	188	45	45	0.40	598	617	606
84	1440	515	2	273	199	199	199	50	50	0.47	610	622	620
85	602	193	3	111	73	73	73	44	44	0.27	602	659	636
86	952	319	11	309	0	0	0	0	0				636
87	3	1	0	1	0	0	0	0	0				680
88	21	6	0	2	4	4	4	4	4	0.25	715	678	685
89	166	53	0	17	36	36	36	36	36	0.42	622	654	659
90	146	48	0	12	36	37	37	37	37	0.56	635	693	597
91	62	20	0	13	6	6	6	6	6	0.00		678	617
92	838	448	0	325	137	137	137	47	47	0.46	538	587	556
93	1292	688	0	419	198	198	198	43	43	0.57	545	583	552
94	795	304	1	305	0	0	0	0	0				606

APPENDIX J: TRAP GEAR GLOSSARY

- Anchor:** Bundle of chains weighing approximately 60 kg (90 lb) that is attached to the groundline on the becket before the first trap and after the last trap. Prevents drifting and sliding of the groundline.
- Anchorline or buoyline:** A 549 m (300 fm) long 22 mm (7/8 in.) 3-ply polypropylene rope permanently attached to the groundline at the first and last becket. This line retrieves the anchor and groundline.
- Baitbag:** 15 x 20 cm (6 x 8 in.) 3.175 mm (1/8 in.) mesh bag with a nylon drawstring and no. 72 stainless steel halibut longline snap.
- Becket:** 13 mm (1/2 in.) diameter two-in-one braided nylon rope spliced into the groundline every 46 m (150 ft). Each becket forms a loop of approximately 15 cm (6 in.).
- Buoy:** 60 to 90 cm (2 to 3 ft) diameter Bright orange inflatable plastic bladders used in combinations of two or three to suspend the sinkerline and buoyline.
- Bridle:** 13 mm (1/2 in.) 3-ply polypropylene rope "double" fastened at three points to the top hoop of the trap and knotted at a single point to form a loop of approximately 158 cm (62 in.) long with a snap bent on to the end. This bridle is fastened onto the top hoop in such a manner that pressure is inward on the tunnel when the trap is being retrieved.
- Drum:** Large capacity spool or drum that stores 3 to 5 complete anchor and groundline combinations.
- Escape panel:** 12 meshes of the trap web located in the upper half of one of the panels opposite the tunnel and cut along the horizontal bar to make a triangular opening of approximately 25 cm (10 in.) when allowed to hang loose. The cut is laced closed with a single piece of 2 mm cotton "butcher" twine. The purpose of the panel is to open when the cotton twine rots if the trap is lost while fishing, i.e. to prevent ghost fishing.
- Flagpole:** Attached to buoys and helps to locate the end of the string.
- Groundline:** 22 mm (7/8 in.) 3 ply polypropylene rope of various lengths depending on the depth of the set.
- Hauler or power block:** Hydraulic powered pulley that hauls all the line at approximately 30 m (100 ft) per minute aboard the vessel prior to winding or storing on the drum.
- Ring:** 52 mm (2 in.) diameter 8 mm (5/16 in.) stainless steel ring bent or knotted onto becket.
- Shotline:** Additional pieces of 22 mm (7/8 in.) polypropylene rope used to extend the anchor or buoyline, usually 91 m (50 fm) or 183 m (100 fm) long.
- Sinkerline:** 19 mm (3/4 in.) 3-ply nylon rope attached to the top of the buoyline or shotlines. The purpose of this line is to prevent the polypropylene anchor or buoyline from floating and "puddling" on the surface and posing a hazard to navigation. The line is usually 91 m (50 fm) or 183 m (100 fm) long.
- Snap:** Galvanised cast steel device with ring on one end and a spring loaded enclosure on the other end strong enough to withstand a 1400 kg (3000 lb) strain.

Traps: The traps are a Korean design adopted and modified by local fishers to local conditions.

They are designed and constructed to stack into each other when transported or stored. The traps are constructed of mild steel rod welded at all junctures. The top hoop diameter is 84 cm (33 in.), the bottom hoop diameter is 137.2 cm (54 in.), and the 6 vertical members are 79 cm (31 in.) long giving the trap a 74 cm (29 in.) vertical height. Horizontal bars are attached midway between the top and bottom hoops in 5 of the 6 vertical panels. The trap is covered or capped with a single piece of black nylon #48 thread 70 mm web (measured inside the knots when the web is stretched flat). This is fastened to the frame so that the top is permanently closed and the bottom can be opened and closed with a draw string. The one side panel without a horizontal bar is not covered with web and accommodates the trap entrance or tunnel. The tunnel is constructed of two pieces of green 44 mm (#18) knotless braided web. The two seams of the tunnel are fastened together prior to attaching to the frame of the trap. When the tunnel is fastened to the trap it slopes downward with a 36 cm (14 in.) opening or slit. The bottom part of the slit will be taut and the top will be loose when the tunnel is stretched into place from the opposite panel of the trap. The tunnel extends 64 cm (25 in.) into the trap. When the trap is prepared for fishing both the tunnel lines and the bottom closing line (4 mm braided single-ply polypropylene twine) are pulled taut, looped together and knotted at a single point. The tunnel and bottom closing lines are of sufficient length to allow the bottom and the tunnel to collapse completely against the inside of the trap to allow for stacking. One of the panels opposite the tunnel contains the escape panel (defined above). Chafing line (10 mm (3/8 in.) and 13 mm (1/2 in.) diameter 3-ply polypropylene) is wrapped around all the frame members to protect the web after the trap is covered.

(Descriptions were modified from Smith et al. 1996)